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THIRTY-THIRD ANNUAL REPORT

OF THE

State Department of Health

OF

NEW YORK

FOR THE YEAR ENDING DECEMBER 31, 1912

ALBANY, N. Y.
J. B. LYON CO., PRINTERS
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1912

STATE OF NEW YORK

No. 33.

IN ASSEMBLY

February 17, 1913

THIRTY-THIRD ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

STATE OF NEW YORK

EXECUTIVE CHAMBER,

ALBANY, N. Y., *February* 17, 1913.

To the Legislature:

I have the honor to transmit herewith the annual report of the State Department of Health for the year 1912.

(Signed) WILLIAM SULZER

41211

New York State Department of Health

Commissioner

EUGENE H. PORTER, M.A., M.D., Dr.P.H.

Division of Administration

Deputy Commissioner........................William A. Howe, M.D.
Secretary........................Alec H. Seymour

Division of Sanitary Engineering

Chief Engineer........................Theodore Horton, C.E.
Principal Assistant Engineer........................H. B. Cleveland, C.E.
Special Assistant Engineer........................Prof. H. N. Ogden, C.E.
Assistant Sanitary Engineer........................C. A. Holmquist, C.E.
Assistant Engineer........................A. O. True, C.E.

Division of Laboratory Work

Director of State Laboratories........................William S. Magill, M.D.
Bacteriologist........................William A. Bing, M.D.
Chief Sanitary Chemist........................L. M. Wachter
Water Analyst........................L. R. Milford
Assistant Water Analyst........................W. S. Davis

Division of Vital Statistics

Director........................F. D. Beagle

Division of Communicable Diseases

Director........................William B. May, M.D.

Division of Publicity and Education

Director........................Hills Cole, M.D.

Consulting Staff

Dermatologist........................Frederic C. Curtis, M.D.
Ophthalmologist........................Herbert D. Schenck, M.D.
Orthopedist........................Harlan P. Cole, M.D.
Laryngologist........................John B. Garrison, M.D.
Statistician........................Prof. Walter F. Willcox, Ph.D.
Pediatrician........................H. L. K. Shaw, M.D.

Tuberculosis Advisory Board

Edward R. Baldwin, M.D........................Saranac Lake
Thomas Darlington, M.D........................New York city
Livingston Farrand, M.D........................New York city
Hon. Homer Folks........................New York city
Alfred Meyer, M.D........................New York city
Prof. Veranus A. Moore, M.D........................Utica
John H. Pryor, M.D........................Buffalo
William H. Watson, M.D........................Utica
John L. Heffron, M.D........................Syracuse

Medical Officers of the State De

F. W. ADRIANCE, M.D., 306 Lake St., Elmi
W. D. ALSEVER, M.D., 529 S. Salina St., S
F. D. ANDREW, M.D., Sodus, N. Y.
CHARLES E. BIRCH, M.D., White Plains, N.
ELLIOT T. BUSH, Horseheads, N. Y.
M. CAVANA, M.D., Sylvan Beach, N. Y.
*EDWARD CLARK, M.D., 571 Ellicott Sq., Bu
W. H. CONNELLY, M.D., 98 Fair St., King
‡H. H. CRUM, M.D., 116 E. State St., Itha
*F. C. CURTIS, M.D., Washington Av., Alba
‡Z. F. DUNNING, M.D., Philmont, N. Y.
*FRANKLIN D. EARL, M.D., 41 Hamilton St
H. A. EASTMAN, M.D., 208 Lafayette St., J
*GEORGE M. FISHER, M.D., 230 Genesee St.,
W. S. GARNSEY, M.D., 93 N. Main St., Glo
JOHN B. GARRISON, M.D., 616 Madison Av.
*‡WILLIAM B. GIBSON, M.D., Masonic Templ
‡CHARLES H. GLIDDEN, M.D., 31 N. Ann S
‡O. J. HALLENBECK, M.D., Canandaigua, N.
DE VERE M. HIBBARD, M.D., 128 S. Union
JOHN B. HUBER, M.D., 167 W. 71st St., Ne
EDWARD H. HUTTON, M.D., 134 E. 1st St.
‡A. D. LAKE, M.D., Gowanda, N. Y.
J. W. LE SEUR, M.D., 207 E. Main St., Ba
FREDERICK J. MANN, M.D., 262 Main St.,
‡PERLEY H. MASON, M.D., 734 South St.,
BURT J. MAYCOCK, M.D., 560 Delaware A
H. E. MERRIAM, M.D., 224 E. State St., I
GEORGE W. MILES, M.D., 11 Washington
DOUGLAS C. MORIARTA, M.D., 511 Broadw
C. F. ORMES, M.D., 318 Main St., Jamestc
F. A. PALMER, M.D., Mechanicville, N. Y
*O. W. PECK, M.D., 34 Watkins Ave., Onec
JOSEPH ROBY, M.D., 52 S. Fitzhugh St.,
B. W. SHERWOOD, M.D., 1117 S. Salina S
ALFRED E. SHIPLEY, 111 Halsey St., Bro
GEORGE E. SWIFT, M.D., 314 Warren St.,
W. C. THOMPSON, M.D., 1 Oak St., Platt
*‡D. M. TOTMAN, M.D., City Hall, Syracus
*‡A. G. WILDING, M.D., Malone, N. Y.
*‡E. S. WILLARD, M.D., 17 Paddock Arcade
‡JOHN S. WILSON, M.D., 22 S. Hamilton
E. H. WOLCOTT, M. D., 57 S. Union St.,
†H. L. WHEELER, D.D.S., 12 W. 46th St., N
†W. A. WHITE, D.D.S., Phelps, N. Y.

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* Smallpox experts.
†Lecturers and consultants on oral hygi
‡Also health officers.

THIRTY-THIRD ANNUAL REPORT OF THE STATE DEPARTMENT OF HEALTH, 1912

Hon. WILLIAM SULZER, *Governor of the State of New York, Albany, N. Y.:*

SIR:— The problems of public health have much in common with certain mathematical problems; X, the unknown quantity, in this instance representing the amount of sickness and death due to preventable disease, will vary inversely with the character and scope of the sanitary regulations, the support of these by public opinion, their enforcement by trained sanitarians, and the money available for public health work. The magnificent achievements of Colonel Gorgas in the canal zone, so widely and rightly heralded in the press, can be duplicated in every hamlet in New York State whenever the people of the community make up their mind to have it so.

As has been well said, public health is a purchasable commodity. The public health of the State is the aggregate of the public health of its cities, villages and towns; and so long as there are municipalities whose total appropriation for public health work is twenty-five dollars a year, divided equally between the salary (?) of the health officer and the incidental expenses of the board of health, and comparatively few communities employing the whole time of a trained sanitarian or appropriating for their health work a reasonable per capita amount, it is surprising that we have been able to make the progress that I am able to report.

It may be that a kind Providence has singled out the Empire State for its benefactions, but the great fact that must not be forgotten is the enormous debt of gratitude we owe to our health officers throughout the State for their self-sacrificing labors in re-

turn for the miserable pittances so grudgingly given for their services. I submit that the community which underpays its public servants is as much of a "grafter" as the public official who fails to render adequate service for the money he draws from the public purse.

Vital statistics is the bookkeeping of public health work and the ultimate measure of its efficiency, and I am pleased to be able to announce that the figures for the year 1912 will show a saving of over 5,000 lives in this State as compared with the statistics for 1911. The death rate this year is 14.6 per thousand population, the lowest that has ever been known in this State. Among sanitarians the world over, the typhoid fever death rate is regarded as a sensitive index of the sanitary condition of a community, and I am gratified to be able to report a typhoid fever death rate for the whole State of approximately 11.8 per 100,000 population, the lowest on record, and 52 per cent. lower than the average yearly rate prior to 1905.

I also call your attention to a lessened mortality by 500 in tuberculosis, with a smaller number of deaths than in either of the eight years preceding, and to a new record for deaths from diphtheria accomplished by diphtheria antitoxin and educational and administrative efforts — last year for the first time the deaths from diphtheria fell below 2,000, this year they are 250 less. It is of interest also to note that for the first time on record the deaths from cancer show but a slight increase over the previous year.

It is impossible for me to emphasize too strongly the importance of the educational work of the Department. Much of the improvement that has been effected has been due to the increased support of the people as a whole and as individuals as a result of their greater knowledge of the principles upon which public health work is prosecuted.

The Public Health Law

I again renew my recommendation for a thorough revision of the public health laws as affecting the State Department of Health and local boards of health. In my previous reports I have pointed out that these statutes are obsolete and inadequate and

must be thoroughly revised to meet the demands of the public for better health service, and to be brought fully abreast of modern scientific knowledge in the control of disease.

The State Laboratory

As pointed out in my report last year, the present laboratory facilities are very inadequate and suitable appropriations for their reconstruction along the following lines should be made.

The present building is a patchwork, non-fireproof structure, the original portion of which was constructed for stable use. There are a small yard and some sheds in connection with the property. These premises have to do duty not only for the great and increasing amount of analytical and bacteriological work, but also for the manufacture and storage of the antitoxins supplied by the Department, and the stabling, exercising yard, and operating room for the horses from which the blood serum which forms the base of the antitoxins, is drawn. The premises are located in a built-up and improving neighborhood, and in spite of the best of care, the keeping of the horses and other animals thereon creates an offense which is a subject of frequent protest from the neighbors. It is hardly too much to say that the State is maintaining a nuisance in the city of Albany.

I recommend that a farm be acquired, located as conveniently to Albany as may be, whereon the horses can be kept throughout the year in a sanitary and healthier condition. The State should also erect in the city of Albany, as close to the Capitol as possible, a suitable fireproof building for laboratory purposes, which will be worthy of the dignity of the Empire State. As stated, the Department's reserve supplies of antitoxins have to be stored in the present building, and, should a fire occur, the health of the whole State would be menaced owing to the destruction of these reserve supplies and the interval that would elapse before a new stock was ready for shipment.

Attention is also called to the fact that if the laboratory is to meet the demands made upon its equipment and the services of its staff by the Saratoga Reservation Commission, county laboratories, etc., there must be special appropriations for this work.

PROGRESS MADE 1905-1

As this is the first report that I have h
mitting to you, before summarizing the w
partment during 1912, I desire to lay before
of the progress that has been made during th

At the time of my appointment as Sta
Health by Governor Higgins in May, 1905,
the Department consisted of a small labora
clerks. Engineering questions were referre
to a consulting engineer employed on a per d
were four medical experts whose services w
same basis for emergency assistance in invest
epidemics of disease. Much of the routine
ment had fallen far into arrears.

After careful study of the current need
and of the channels through which it coul
improvement and protection of the public
the Department, creating the following divi
Sanitary Engineering, Laboratory Work,
municable Diseases, Publicity and Educatio

This organization has justified itself, an
throughout the past eight years. As I ha
clear to the members of the Ways and Me
the Finance Committee of the Legislature
sion of the work of the Department, large
been granted which have enabled me to
professional staff commensurate with the I
activities. The office of Deputy Commissi
each division has its director; there is a
experts; a tuberculosis advisory board of
three medical experts available on a per
investigations; and a staff of twenty-two l
diem basis, whose services are used in r
received by the Division of Publicity and

Division of Sanitary Engi

This division has placed on file a sanita
which gives information as to public and

sewer systems, methods of disposal of garbage, etc., in each community. Systematic effort has been made to enforce the law of 1903, with regard to the pollution of streams. In order that the Department could deal intelligently and comprehensively with this subject, thorough examinations of the entire watersheds of the Susquehanna river, the Hudson river, Black river, Delaware river, Genesee river and a number of smaller streams have been made. Based on these investigations, stringent conditions have been laid down concerning reconstruction of or additions to existing sewerage systems, and plans for sewage disposal plants have been called for where advisable.

In 1906 an amendment to the Public Health Law was secured giving the Commissioner of Health authority to order special investigations upon watersheds surrounding public water supplies; and action was taken which resulted in a wholesale cleaning up of the watersheds of the State. An investigation to determine the number, operation and efficiency of sewage disposal plants in the State was made. Special sanitary investigations have been made of a number of cities in the State showing a high death rate from typhoid fever, and recommendations have been made to, and in most instances gratefully accepted by, the local authorities looking to the abatement of insanitary conditions.

For the protection of the health of summer visitors, 994 summer resorts have been investigated by the Department, the inspector's report giving information as to construction of the buildings, ventilation, location and sanitary conditions of wells, privies, cesspools, etc., water supply, plumbing, disposal of sewage and garbage, milk supply, and cases of communicable diseases (including tuberculosis) that have existed on the premises. Recommendations for sanitary improvements have been made by the Department, and their installation has been checked up by reports of re-investigations. The Public Health Law gives me no adequate control over these premises, and if the proprietors or lessees have failed to carry out my recommendations, I have to content myself with publishing the facts of the particular cases in the Department's Monthly Bulletin.

The sanitary condition of the ice taken from the Hudson river for the New York City supply was made the subject of a special investigation. It was found that the condition was compara-

tively free from danger; dealers harvesting ice from neighborhoods where the water is badly polluted were recommended to transfer their fields of operation to other localities. This was as far as the law enabled me to go in this matter. Illegal construction of sewers has been stopped whenever it could be effected under the provisions of the Public Health Law.

In addition to the foregoing, the routine work of this division in examining and reporting on plans for sewer systems or extensions, investigation of alleged nuisances, etc., has been kept up to date.

Division of Laboratory Work

Prior to 1905 the State laboratory was used only for the preparation of antitoxin; other work was done at outside laboratories and paid for by fees or special charges. To effect economies and permit of extension of work, the laboratory building was enlarged and equipped with apparatus and an adequate working force. Since then the laboratory has made regular analyses of the specimens of water taken from municipal and other supplies, has investigated the effluent from sewage disposal plants, and made special reports upon the purity of foods, wines and liquors. It has assisted the division of communicable diseases by making laboratory diagnoses of various infectious diseases, and by taking part in field investigations of epidemics. Short courses of instruction for health officers, consisting of lectures, demonstration, laboratory experiments, etc., have been held at the laboratory from time to time. The monthly distribution of diphtheria and tetanus antitoxin is now more than the total annual amount issued by the department ten years ago. Since 1909 the laboratory has provided a prophylactic treatment for the prevention of inflammation of the eyes of the new born (ophthalmia neonatorum); distribution is made to every practising physician and midwife through the health officers.

Division of Vital Statistics

Increased efficiency among the workers in this division, much educational work among local registrars and physicians, and amendments to the Public Health Law, secured by the depart-

ment, have effected a great improvement in the registering of vital statistics in this State, especially in regard to the registering of births. Whenever registrars have been delinquent in making their reports I have sent some one to take charge of the local office and compile the statistics at the expense of the municipality.

Division of Communicable Diseases

Prior to 1905 little attempt was made to enforce the law calling upon health officers to promptly report cases of communicable diseases. Now, practically all the reports required to be made monthly are received on time, and in the majority of instances immediate detailed reports of cases are sent in by the health officers. As a result the department has been able to aid the local authorities by advice or personal assistance, and has been able to effect considerable improvement in the incidence of the morbidity and mortality from communicable disease.

Prior to 1906 no organized efforts by the State Department of Health had been made to awaken public interest in the ravages of tuberculosis. A campaign for this purpose was then started and an appropriation was secured for the construction of a traveling exhibit, consisting of maps, charts, photographs, models, etc., forming an object lesson in the value of sanitary methods of living as a means of preventing and combatting this disease. No registration of cases of tuberculosis having been made hitherto, I ordered that all local boards of health should report on and after January 1, 1907, to the State Department of Health all cases of tuberculosis. The Legislature of 1908 passed two bills dealing with the control of tuberculosis, and the department formulated the plans for putting them into execution, including the draughting of the special forms and report blanks, etc. An extensive educational campaign has been more or less continuously in progress ever since, the agencies employed being public lectures, press articles, the distribution of thousands of pamphlets and circulars, and exhibits in cities and at State and county fairs.

The exhibit made by the department at the International Congress on Tuberculosis at Washington in 1908 received the gold medal for the best exhibit of effective work from any State, and some of its features have been copied by public health workers all over the world.

I have consistently urged the constructior county tuberculosis hospitals, and nine cou institutions, three have buildings under cor secured sites for their hospitals, eight are l counties send their patients to hospitals ir seats, and four are investigating the ne hospitals.

In considering the work of this division tions from an exhaustive paper on " The New York," presented at the last Sanitary (Mr. Frederick L. Hoffman, the well-know Prudential Insurance Company, are of inte

> " The typhoid fever rate, as a rule, l rural districts than in the cities. * * typhoid fever throughout rural New Y material improvement during the la decade under review. (1900–09.)
>
> " While the improvement in the n fever has not been considerable, the e dence that the tendency is towards a di rence of scarlet fever epidemics of exe
>
> " There has been a decided decreas diphtheria in both cities and rural d State.
>
> " The tendency of the mortality rate both the cities and rural districts reduction."

There appears to be conclusive evidence t cancer is on the increase, and this disease list of those required to be reported, in o may make special study of its incidence a its causation. Epidemics of infantile paraly occurred in different parts of the State du these have been made the subject of speci department, and I have also sought assist States public health service in making epi

and its circulation extended from 1,500 to 10,000. It is always carefully read by the great majority of health officers and it is freely quoted from by the daily and professional press of this and other States, and it is not too much to say that it takes high rank among publications of this character. Large editions of circulars of instruction (some of them in foreign languages) on the various infectious diseases have been distributed. Educational exhibits have been shown at State and county fairs. A series of illustrated lectures on public health subjects has been prepared. For the instruction of health officers a number of sanitary institutes have been held and the annual sanitary conference has grown from a gathering of a comparatively small number of health officers, to a series of meetings having an attendance of several hundreds, invitations to address which are considered an honor by distinguished sanitarians of national reputation.

In co-operation with Cornell University, a course of lectures on sanitary science and public health has been established at that institution; and the Department has also co-operated with the deans of various medical schools in this State in giving their students a reasonably full course of instruction along these lines.

Miscellaneous Work

In 1906, the Department caused an investigation to be made of every meat market, slaughter house and meat-packing establishment in the State, and local authorities were urged to correct all abuses discovered and to maintain local inspection. In accordance with the provisions of the Cold Storage Law of 1911, the Department has regularly investigated the sanitary condition of about 150 cold storage plants, and has promulgated regulations for the sanitary conduct of this business.

In co-operation with the educational authorities, the Department has caused to be made regular examinations of the eyesight and hearing of all school children in towns and smaller villages, and has drawn the attention of parents to the existence of any defects. Special lectures on mouth hygiene and the care of the teeth have been given in many schools. An investigation of all waters supplied for drinking purposes on the railroad lines in this State was made, as also an investigation in the laboratory

and in the field of the pollution of oysters Long Island and adjacent waters.

As an index of the great increase of the ment now as compared with what was atten it may be mentioned that during May, 19 number of pieces of first-class mail mat whereas for some time past the daily avera with shipments from the office running all to 30,000 per month. It is not contended, partment has reached the limit of its usefu ening of the powers conferred on the Comm Health Law, and adequate appropriation present activities be extended, but new li be opened up to the great advantage of welfare of the citizens of the State.

SUMMARY FOR 191

DIVISION OF ADMINISTR

Cold Storage Law

The cold storage law has continued to b and enforced, particular attention having the past year to the sale of cold storage g visions of the law requiring that goods sl for a period of ten months only, and the s plants.

Regular and thorough inspections hav cold storage plants in the State and in a partment has undertaken to inspect as fr of the retail places in the State selling insisted that the regulations of the De storage butter, poultry and eggs to be so r ing the words "cold storage," shall be fu

The sanitary conditions of cold storag siderably improved and there are but at the present time that are open to crit to careless management.

The ten months' clause in the law is being complied with, the result being that large quantities of goods are placed upon the market which would otherwise be held for a longer period.

The retail establishments throughout the State have all been notified of the regulations of the Department, and those found violating the law or the regulations hereafter, will be prosecuted.

The Department has been somewhat handicapped in its work owing to the death of Hon. Thomas A. Brennan, who was counsel to the Department in the cold storage work, and to whose efforts the successful operation of the law is largely due.

There are a number of amendments which should be made to the statute to make its operation successful. The statute should be amended to require cold storage and refrigerating plants to secure a license from the State Department of Health. This will enable the Department to know where every plant is located and when a new business is started, and power should be given to revoke the license if the plant is conducted in an insanitary manner. The law should prohibit the storage of articles of food intended for human consumption when diseased or otherwise unwholesome, and power should be given to condemn foods that are found in a similar condition.

The regulations of the Department have been amended so that they now read as follows:

Rules and Regulations Governing Cold Storage and Refrigerating Warehouses and Places — Issued by the State Commissioner of Health in Accordance with Section 338 of Chapter 335 of the Laws of 1911.

The following provisional rules relating to the enforcement of an act, entitled "An act to amend the Public Health Law, relating to Cold Storage and Refrigerating Warehouses and Places, and the sale or disposition of the food kept or preserved therein," revised March 15, 1912, have been adopted by the State Commissioner of Health.

These rules are to be regarded as temporary only, and as occasion requires, the State Commissioner of Health will amend, alter and supplement them. Due notice of such alteration will be given to all persons interested.

1. For the purpose of enforcing this act the term "cold storage," will be held to mean the storage of foods at or below a tem-

perature of forty degrees Fahrenheit, in establ
refrigerating machinery or ice.

The term "Cold Storage Warehouse or
house" will be held to mean an establishmen
erating machinery or ice for the purpose of f
which foods are stored at a temperature of
heit or below.

2. Articles of food intended for cold stor
are offered for, or placed in storage, be enclo
crates or other packages sufficiently strong t
injury, unless the articles are of such a cha
practicable to pack them in containers.

3. When articles of food contained in pack
cold storage, each package shall be legibly m
purple waterproof ink as follows: The name
pany and place in which it is located; below th
Storage;" below that the word "Received" fo
month and year when said articles were plac

The word "delivered" followed by the da
when such articles are taken from storage, sh
such foods or packages before being removed t

When articles of food not contained in
in cold storage, each individual article mu
above manner.

All letters or figures must be in plain typ
eighths of an inch in height.

The word "Received" may be written "
"Delivered" may be written "Del'd." and
hyphens may be used to indicate dates and
sufficient date if following the words "Rec
the case may be. The last two figures of th
the year when such foods were placed or tak
be used, *e. g.*, "Received September 1, 19
"Rec'd 9-1-11," or "Delivered September 1,
ten "Del'd 9-1-11."

Whenever tags are used on which to mark
so securely fastened to the article to which

4. Food held in receiving rooms for a period not to exceed one week, must be stamped with the date of receipt and delivery and with the name and location of the storage company, but need not be marked "cold storage."

5. Articles of food held at low temperature during the process of manufacture will not be regarded as being held in cold storage within the meaning of this act, and such articles need not be dated.

6. The floors, halls, walls, ceilings, furniture, receptacles, implements and machinery of every cold storage or refrigerating warehouse shall be kept in a clean, healthful and sanitary condition; and, for the purpose of this rule, unclean, unhealthful or insanitary conditions shall be deemed to exist if the food stored is not securely protected from flies, dust, dirt, insects and from all other foreign or injurious contamination.

7. Toilet rooms shall be separate and apart from the rooms in which food is stored, cuspidors for the use of employes must be washed daily with disinfectant solution.

8. No employer shall knowingly require, permit or suffer any person to work, nor shall any person work, in a cold storage or refrigerating warehouse who is affected with any infectious or contagious disease.

9. The representation of cold storage poultry, fish and eggs required under section 339-c, may be made by the retailer by placing upon such articles or upon the receptacles containing them, in full view of the public, a card not smaller than six inches in height by ten inches in length, upon which shall be printed the words "cold storage" in plain letters not less than two inches in height.

Reports of Warehousemen — The following are the reports of quantities of foods in storage submitted by the warehousemen under the provisions of the law:

TOTAL AMOUNTS OF GOODS IN COLD STO

DATES

DATE	Eggs	Butter
	Cases	*Pounds*
September 1, 1911	790,712	10,884,42
January 1, 1912	112,573	3,596,48
May 1, 1912	206,661½	175.22
September 1, 1912	912,387½	15,345,87

REPORTS OF COLD STORAGE PLANTS — NEW

NAME AND ADDRESS	Capitalization	AMOUNT OF — Eggs	B
		Cases	*P*
Arctic Freezing Co., New York	$60,000	....	...
Bronx Refrigerating Co., New York	700,000	9,295	
Brooklyn Bridge Freezing & Cold Storage Co., New York	50,000	....	...
Empire Cold Storage Co., New York	5,000	....	...
George C. Engel Co., New York	20,000	....	...
Harrison Street Cold Storage Co., New York	100,000	4,246	
Heermance Storage & Refrigerating Co., New York	100,000	3,954	
F. C. Linde Co., New York	300,000	664	
Manhattan Refrigerating Co., New York	400,000	9,072	
David Mayer & Co., New York	....	....	...
Merchants Refrigerating Co., New York	600,000	13,441	
Riverside Cold Storage Co., New York	500,000	....	...
A. Sils, Inc., New York	100,000	....	...
Swift & Co., New York	....	....	...
Terminal Warehouse Co., New York	1,000,000	....	
Richard Webber, New York	....	60	
Hutwelker & Briggs Co., Brooklyn	75,000	....	...
Kings County Refrigerating Co., Brooklyn	200,000	8	...
Riverside Cold Storage Co., Brooklyn	....	....	...
Swift & Co., Brooklyn	....	....	...
	$4,210,000	40,740	2
Arctic Ice & Cold Storage Co., Buffalo	$85,000	1,229	
Buffalo Cold Storage Co., Buffalo	400,000	20,823	
Hasselbeck Cheese Co., Buffalo	200,000	....	
	$685,000	22,052	
Total — New York and Buffalo	$4,895,000	62,792	2

REPORTS OF COLD STORAGE PLANTS — OUTSIDE NEW YORK AND BUFFALO

NAME AND ADDRESS	Capital-isation	Amount of Goods on Hand Jan. 1, 1912			
		Eggs	Butter	Poultry	Meat — fresh and salted, etc.
		Cases	*Pounds*	*Pounds*	*Pounds*
Eastern States Refrigerating Co., Albany	$600,000	9,263	88,800	376,700	75,000
Hygenic Ice & Refrigerating Co., Albany	300,000	9,906	80,852	246,198	118,735
W. N. Carpenter Co., Amsterdam	20,000	34	4,390	....	....
Koenig Cold Storage & Warehouse Co., Auburn	75,000	96	4,347	124	4,621
Ballston Refrigerating Storage Co., Ballston Spa	100,000	1,866	12,853	....	....
Binghamton Cold Storage & Ice Co., Binghamton	254,400	8,261	92,520	2,984	1,766
Boonville Creamery & Cold Storage Co., Boonville	20,000	....	2,280	....	....
M. H. Diefendorf, Canajoharie	....	185	16,500	....	....
J. B. Maltby, Inc., Corning	10,000	72	5,541	....	....
T. E. Dye & Son, Cortland	....	1,500	10,000	10	....
Cortland Beef Co., Cortland	25,000	76	18,230	47	27,894
Hygeia Refrigerating Co., Elmira	80,000	1,400	152,100	971	....
A. & H. A. Baldridge Co., Geneva	40,000	343	2,600	....	....
J. P. Heacock, Gloversville	....	1	692	....	....
Chautauqua Refrigerating Co., Jamestown	50,000	36	1,000	....	....
Jamestown Cold Storage Co., Jamestown	60,000	25	3,000	....	....
Little Falls Warehousing Co., Little Falls	100,000	1,575	4,100	....	....
Stacey Warehouse Co., Little Falls	50,000	15	2,920	....	....
Locke Cold Storage Co., Locke	11,000	145	1,600	....	....
Niagara Cold Storage Co., Lockport	....	425	2,100	400	....
Lowville Cold Storage Co., Lowville	....	7	586	....	....
Barnes & Atkins, Newburgh	....	86	26,047	....	9,400
Clay Produce Co., Poughkeepsie	25,000	795	36,642	....	....
William T. Reynolds & Co., Poughkeepsie	....	895	37,200	....	....
Brighton Cold Storage Co., Rochester	150,000	543	27,962	873	....
Rochester Cold Storage & Ice Co., Rochester	70,000	....	....	2,682	2,600
E. M. Upton Cold Storage Co., Rochester	193,000	297	24,980	19,775	101,665
Franklin Refrigerating Co., Saranac Lake	30,000	7	1,508	5,730	24,033
Kingan Provision Co., Syracuse	5,000	838	40,074	6,044	35,808
Syracuse Cold Storage Co., Syracuse	200,000	3,452	252,526	47,343	61,013
Troy Cold Storage Co., Troy	165,000	7,277	226,260	72,967	12,040
Utica Cold Storage & Warehouse Co., Utica	30,000	360	56,879	12,798	300
Sevrule-Brown & Co., Wellsville	200,000	....	31,166	....	....
Total	$2,863,400	49,781	1,268,255	795,646	474,875
Total — all plants	$7,758,400	112,573	3,596,485	17,344,925	7,010,283

REPORTS OF COLD STORAGE PLANTS — NEW

NAME AND ADDRESS	AMOUNT OF G… Eggs (Cases)
Arctic Freezing Co., New York	....
Bronx Refrigerating Co., New York	46,603
Brooklyn Bridge Freezing & Cold Storage Co., New York	....
Empire Cold Storage Co., New York	....
George C. Engel Co., New York	....
Greenwich Stores, Inc., New York	....
Harrison Street Cold Storage Co., New York	17,971
Heermance Storage & Refrigerating Co., New York	9,758
F. C. Linde Co., New York	4,028
Manhattan Refrigerating Co., New York	10,605
David Mayer & Co., New York	....
Merchants Refrigerating Co., New York	....
Riverside Cold Storage Co., New York	800
A. Sils, Inc.	....
Swift & Co., New York	....
Terminal Warehouse Co., New York	406
Richard Webber, New York	....
Hutwelker & Briggs Co., Brooklyn	....
Kings County Refrigerating Co., Brooklyn	3,000
Riverside Cold Storage Co., Brooklyn	....
Swift & Co., Brooklyn	....
	93,171
Arctic Ice & Cold Storage Co., Buffalo	4,676
Buffalo Cold Storage Co., Buffalo	25,033
Hasselbeck Cheese Co., Buffalo	....
	29,709
Total — New York and Buffalo	122,880

REPORTS OF COLD STORAGE PLANTS — OU

BUFFALO

Eastern States Refrigerating Co., Albany	14,710
Hygienic Ice & Refrigerating Co., Albany	7,413
W. N. Carpenter Co., Amsterdam	2
Koerig Cold Storage & Warehouse Co., Auburn	....
Ballston Refrigerating Storage Co., Ballston Spa	263
Binghamton Cold Storage & Ice Co., Binghamton	2,248
Boonville Creamery & Cold Storage Co., Boonville	....
M. H. Diefendorf, Canajoharie	365
J. B. Maltby, Inc., Corning	393
Cortland Beef Co., Cortland	13
T. E. Dye & Son, Cortland	4,025
Hygeia Refrigerating Co., Elmira	8,200
A. & H. A. Baldridge Co., Geneva	200
Little Falls Warehousing Co., Little Falls	5,350
Stacey Warehouse Co., Little Falls	17
Locke Cold Storage Co., Locke	3,000
Niagara Cold Storage Co., Lockport	1,367
Lowville Cold Storage Co., Lowville	17
Barnes & Atkins, Newburgh	258
Clay Produce Co., Poughkeepsie	513
William T. Reynolds & Co., Poughkeepsie	400
Brighton Cold Storage Co., Rochester	6,429
E. M. Upton Cold Storage Co., Rochester	1,230
Franklin Refrigerating Co., Saranac Lake, N. Y.	10½
Kingan Provision Co., Syracuse	2,955
Syracuse Cold Storage Co., Syracuse	8,292
Troy Cold Storage Co., Troy	15,509
Utica Cold Storage & Warehouse Co., Utica	602
Scoville-Brown & Co., Wellsville	....
Total	83,781½
Total — all plants	206,661½

REPORTS OF COLD STORAGE PLANTS — NEW YORK AND BUFFALO

NAME AND ADDRESS.	AMOUNT OF GOODS ON HAND SEPT. 1, 1912			
	Eggs	Butter	Poultry	Meat — fresh and salted, etc.
	Cases.	Pounds.	Pounds.	Pounds.
Arctic Freezing Co., New York	....	....	23,800	63,700
Bronx Refrigerating Co., New York	96,115	179,460	40,133	400,151
Brooklyn Bridge Freezing & Cold Storage Co., New York	....	....	1,200	2,000
Empire Cold Storage Co., New York	....	....	247,772	79,698
Harrison Street Cold Storage Co., New York	81,303	2,880,360	1,166,034	66,703
Hermance Storage & Refrigerating Co., New York	43,707	436,680	25,360	23,000
F. C. Linde Co., New York	931	150,530	1,070	87,890
Manhattan Refrigerating Co., New York	57,586	157,348	89,023	1,158,913
David Mayer & Co., New York	....	....	240	....
Merchants Refrigerating Co., New York	149,590	3,908,640	490,550	150,560
Riverside Cold Storage Co., New York	2,480	110,130	132,191	155,969
A. & M. Robbins, Inc., New York	....	....	37,490	1,209
A. Sils, Inc., New York	....	....	78,965	6,346
Swift & Co., New York	....	....	1,736	76,736
Terminal Warehouse Co., New York	1,392	70,266	63,418	1,172,804
Richard Webber, New York	....	6,290	109,893	125,446
Hurwelker & Briggs Co., Brooklyn	....	....	....	216,132
Kings County Refrigerating Co., Brooklyn	1,000	6,000	200,000	200,000
Riverside Cold Storage Co., Brooklyn	....	1,260	100,804	148,147
Swift & Co., Brooklyn	....	1,404	10,254	250,403
	434,104	7,908,368	2,819,933	4,385,807
Arctic Ice & Cold Storage Co., Buffalo	32,034	86,800	2,119	....
Buffalo Cold Storage Co., Buffalo	158,736	2,291,610	498,412	243,232
Hamelbeck Cheese Co., Buffalo	....	11,990	....	5,700
	190,770	2,300,400	500,531	248,932
Total — New York and Buffalo	624,874	10,298,768	3,320,464	4,634,739

REPORT OF COLD STORAGE PLANTS — OUTSIDE NEW YORK AND BUFFALO

Empire State Refrigerating Co., Albany	47,600	323,000	8,500	80,000
Empire Ice & Refrigerating Co., Albany	30,949	553,019	13,926	77,111
W. N. Carpenter Co., Amsterdam	275	6,897	....	1,200
Ballston Refrigerating Storage Co., Ballston Spa	2,535	30,934	....	....
Binghamton Cold Storage & Ice Co., Binghamton	17,817	180,472	....	10,756
Boonville Creamery & Cold Storage Co., Boonville	....	130	....	....
M. E. Dolendorf, Canajoharie	1,210	31,380	....	....
Exeter Cold Storage Co., Chateaugay	454	92,560	....	....
J. B. Malloy, Inc., Corning	739	8,450	....	....
Cortland Beef Co., Cortland	1,197	91,260	150	45,000
T. E. Dye & Son, Cortland	17,000	70,000	....	....
Empire Refrigerating Co., Elmira	22,450	563,600	....	....
A. & B. J. Baldridge Co., Geneva	2,773	5,847	....	....
Jamestown Cold Storage Co., Jamestown	1,004	24,360	....	....
Little Falls Warehousing Co., Little Falls	7,890	48,475	....	....
Slater Warehouse Co., Little Falls	600	90,000	....	....
Locke Cold Storage Co., Locke	7,240	4,500	....	....
Niagara Cold Storage Co., Lockport	3,813	20,603	....	....
Lowville Cold Storage Co., Lowville	43	422	....	....
H. Dickinson & Co., Malone	77	16,270	....	....
R. B. Rennie, Malone	120	150	....	940
Barnes & Atkins, Newburgh	400	11,640	....	14,600
City Produce Co., Poughkeepsie	2,093	63,650	....	....
William T. Reynolds Co., Poughkeepsie	2,500	72,000	....	....
Brighton Cold Storage Co., Rochester	11,531	217,260	1,600	120
E. M. Upton Cold Storage Co., Rochester	7,572	102,700	6,235	7,575
Franklin Refrigerating Co., Saranac Lake	436½	3,267	10,694	6,522
Kinney Provision Co., Syracuse	5,196	70,235	....	146,951
Syracuse Cold Storage Co., Syracuse	33,688	1,305,996	24,595	78,292
Troy Cold Storage Co., Troy	54,737	693,300	10,775	50,583
Griffith M. Jones & Co., Utica	5	10,767	310	22
William E. Owen & Sons, Utica	1,184	34,076	....	....
Utica Cold Storage & Warehouse Co., Utica	2,385	281,438	2,307	4,110
Scoville-Brown & Co., Wellsville	....	18,450	....	....
Total	287,513½	5,047,108	79,092	524,382
Total — all plants	912,387½	15,345,876	3,399,556	5,159,121

Tuberculosis Hospitals

The co-operative work with the State Chari and for the education of the public in the culosis has been continued during the past have been particularly directed to procuring more county tuberculosis hospitals in order facilities for tuberculosis patients. To tha have been sent through a number of the coun the effect of the educational work done has

The operation of the present law requirin cases of tuberculosis is not in all respect should be amended so as to secure better reg for more control over certain classes of case

Nine applications for approval of sites pitals were filed with the Department durin were as follows:

The county of Saratoga filed an applica establish a tuberculosis hospital in the to a hearing was held at Ballston Spa on Janu was granted on January 19.

The county of Oswego filed an applica establish a tuberculosis hospital in the tow ing was held at Oswego on February 5. granted February 28.

The county of Tompkins filed an ap to establish a tuberculosis hospital in the hearing was held at Ithaca on Februar was granted February 20.

The county of Montgomery filed an a to establish a tuberculosis hospital in the a hearing was held at Amsterdam on M was granted on May 21.

The Middletown Tuberculosis Dispe for permission to establish a tuberculos Goshen, Orange county, and a hearin May 29. The application was denied

The Dunkirk Tuberculosis Committ permission to establish a tuberculosis

Dunkirk, Chautauqua county, and a hearing was held at Dunkirk on June 21. The application was granted July 6.

The Glenwood Health Resort filed an application for permission to establish a tuberculosis hospital in the town of Thompson, Sullivan county, and a hearing was held at Albany on October 16. The hearing was adjourned to November 8, at Monticello, but the petition was withdrawn before that date.

The county of Saratoga abandoned the Greenfield site and filed an application for permission to establish a tuberculosis hospital in the town of Providence, and a hearing was held at Ballston Spa on October 1, and an adjourned hearing in Albany on October 22. The application was granted November 19.

The county of Westchester filed an application for permission to establish a tuberculosis hospital in the town of Yorktown, and a hearing was held at White Plains on October 17, and an adjourned hearing on October 28. This application was strongly opposed by the officials of the city of New York, a number of civic bodies and several property owners. The principal objection to this site was, that it was located upon the Croton watershed and that the effluent from the sewage disposal plant would drain into the water supply of the city of New York.

The farm in question is located about three-quarters of a mile from Croton reservoir and two brooks flow through it, which enter the reservoir. It was designed to erect a hospital for 200 beds.

After a careful examination of the evidence and an inspection of the site, the application was denied upon the ground that there was a danger to the water supply of the city of New York, that there could be no assurance that the sewage disposal plant would always be satisfactorily operated, and that in view of the possibility of danger of contamination to the water supply the application must be denied.

Division of Sanitary Engineering

In my previous annual reports I have dwelt successively upon the progress and development of the engineering division from the time (eight years ago), when the duties required by the Public Health Law involving engineering skill and judgment were performed through the partial services of one man, through successive

years and with the impetus always afforded through an efficient organization to a point when it has become a prime motive force in the work accomplished by the department. Comparatively few people are able to understand, and even less appreciate, how many administrative duties and health problems fall within the scope and province of the engineering division. The more it is understood the greater will be the development of this branch of public health service, and the greater will be the safeguards to the public health and to the comforts and conveniences of life throughout the State.

The year 1912 may be considered as unprecedented in the amount of work accomplished by the engineering division. Some 2,200 matters have been referred to it for consideration, involving in a large majority of cases careful investigation, reports, or letters of advice, and the satisfactory disposition of which required the issuance of some 3,200 communications.

That the nature of these matters may be more readily understood and the character of the work of the engineering division more easily appreciated, the more important of these matters may be enumerated under the following classification: Plans examined and reported upon, 175; reports submitted to commissioner, 285; investigations of water supplies, 60; investigations of public nuisances, 239; investigations relating to municipal sewerage systems, 14; investigations of typhoid fever epidemics, 9. In addition to these some 260 conferences were held and some 33 lectures and addresses given by the chief engineer or other members of staff.

Having presented this brief numerical summary of the work of the sanitary engineering division, I will now refer in some detail to the work performed by the division during 1912 under the same classification of headings adopted in my previous annual reports.

Protection of Public Water Supplies — In every field of public service work there are certain activities, the importance of which stand out prominently in the light of benefits accomplished. In the public health service, especially the engineering field, the protection of public water supplies occupies this prominent position. The reason for it is obvious. Every person takes water

daily into his system. If the water is contaminated the transmission of disease is invited. To supply water free from contamination is the duty of every municipality, and to see that this duty is performed by municipalities and the public health protected from this source of danger is one of the duties of a State Department of Health.

The protection of the purity of the public water supplies of the State thus represents clearly one of the most important fields of activity of the engineering division, and these activities have been directed along two special lines the scope of which are governed by the requirements of the Public Health Law.

(a) Protection of public water supplies for which rules and regulations have been enacted:

In connection with carrying out the work of the Department in the protection of the public water supplies, the engineering division is called upon to draw up for enactment, under the provisions of the Public Health Law, rules and regulations for the sanitary protection of the water supplies of those municipalities which have applied for such enactment through the board or corporation having charge of the waterworks. The enforcement of such rules and regulations requires that certain action be taken by this Department in conjunction with the waterworks officials and with the local board or boards of health having jurisdiction over the territory embraced by the rules and regulations.

Specifically, the duty of this Department in reference to the enforcement of such rules and regulations consists in the inspection and verification of cases of violations reported to the Department by the proper local authorities, and the issuance of orders to local boards of health to convene and enforce obedience to the rules and regulations. The considerable amount of field work and the routine work of preparing and transmitting the orders necessitated by a thorough observance of the Public Health Law has been done by the engineering division.

There are some 80 water supplies, of a total of some 440, in the State, where rules and regulations have been enacted under the provisions referred to. Previous to the drafting of rules and regulations for any municipality it has been the practice of this division to make a careful field inspection of the watershed of the

water supply in question in order that
and regulations may be adapted to tl
quirements.

During 1912 there were before the
or amendment rules and regulations 1
supplies in the cases of the following

Central Valley and Highland Mills
Cortland
Glens Falls
Hornell
Kingston (amendment)
Peekskill
Philmont
Suffern

Of the above, rules and regulations
of Cortland, Glens Falls and Hornell, :
and the amendments were enacted for
the village of Peekskill. In the case
Highland Mills and the village of Philn
were fully drafted, and the Departmen
the local authorities before their final en

During 1912 inspections of violation
were made, and the necessary orders
issued, in connection with the water :
municipalities:

Avon and Geneseo
Deansboro
Kingston
Peekskill
West Carthage

In my last annual report reference v
vestigation which was undertaken in ord
ence of violations of rules and regulation
lic Health Law to protect public water :
tion. In the carrying out of this inves
found on twenty-four of the thirty-fo
and as a result of this investigation it wa
the close of the past year, to issue a gen

visions of Section 71 of the Public Health Law in all cases where rules and regulations have been enacted requiring boards of water commissioners and water companies to make regular and thorough inspections of their watersheds to determine violations of the rules, to take the proper steps to require the abatement of any violations found and to report fully in writing to the State Commissioner of Health on the first day of January of each year, the results of such regular inspections with the action taken and the number of violations still remaining.

While the necessity for issuing this general order is obvious, it should be explained that many of the municipalities included in the order voluntarily maintain a careful oversight over the watersheds from which the public water supplies are derived and report promptly to this Department for further action any violations found, as provided by the Public Health Law.

(b) Protection of water supplies for which rules and regulations have not been enacted.

There are now in the State about 360 public water supplies for which rules and regulations have not been enacted by this Department. Many of these are obtained from wells or springs, whose watersheds are necessarily indefinite as to extent and the protection of which by rules and regulations presents engineering and legal difficulties which would make their enforcement difficult if not impracticable. Desirable as it might be in some cases to establish definite rules and regulations for the protection of these ground water supplies, on the other hand the water from such sources, except in such cases as there is a gross pollution from obviously insanitary and dangerous surroundings, is subject to protection from distant or chance pollution by reason of its natural filtration in passing through the ground.

A majority of these 360 public supplies are, however, derived from surface sources and, as I have pointed out in my previous reports, probably the chief reason why so many surface water supplies have not, up to the present time, been protected by the enactment of rules and regulations is to be found in the expense to the municipality attendant upon the enforcement of such rules in the manner prescribed by the Public Health Law. That there is a great need for the extension of some form of sanitary

protection of watersheds by or with th
phasized in the contamination and opp
tion which have been found to exist up
lic supplies by the engineering divisi
which the Department has undertaken
examination of public water supplies n

The special investigations of water
rules, have been undertaken by this I
specific provision of the Public Healtl
important public health duty. These
begun by the engineering division ir
number and importance, and the field
in connection with the inspection of
of samples of water for analyses, consu
and transmittal of reports embodying
dations arrived at after a study of tl
each water supply, now constitute a co
of the division.

This work has been productive of
proved conditions of the sanitary qual
have been examined and reported upo
have sanitary improvements been ma
question in the way of diverting pol
abating of dangerous sources of pollut
cation works of one type or another l
the need or desirability of such wor
recommended in the reports upon thes

During the year of 1912 such in
and reports prepared and transmitte
cases of the following municipalities

Amenia	Da
Ausable Forks	De
Castleton	El
Champlain	G
Cincinnatus	G
Coeymans	G
Corinth	G
Coxsackie	H

ith the aid of the State, is em-
ıd opportunities for contamina-
ist upon the watersheds of pub-
livision in the voluntary work
aken in recent years of special
ies not protected by rules.
vater supplies, unprotected by
is Department not under any
alth Law, but as an obviously
se investigations, which were
in 1908, have increased in
ld work and office work done
f local conditions, collection
ultation and the preparation
conclusions and recommen-
he individual conditions of
nsiderable part of the work

valuable results in the im-
ity of water supplies which
ı. Not only in many cases
le upon the watersheds in
ution and the removal and
on, but in some cases purifi-
ave been constructed where
ks has been pointed out or
special investigations.
stigations have been made
to local authorities in the

sville
ıvan
cottville
hen
randa
ranville
Greenwich
Highland

Hilburn
Homer
Hoosick Falls
Jay
Larchmont
La Salle
Liberty
Matteawan
Nassau
Norwood
Nyack
Owego
Pawling
Philmont
Piercefield
Potsdam
Ravena
Richmondville
Rosendale
St. Johnsville
Silver Creek
Sloatsburg
Valatie
Warrensburg
Watervliet
Wellsburg
Western N. Y. Water Co

During the year many requests have been received for examination of insanitary conditions affecting the condition of public water supplies. In response to such requests considerable routine work has been done by the engineering division in addition to the complete or special examination of public water supplies. Such examinations have usually entailed a field inspection of certain special features, which have been reported upon and advice given to the authorities in charge or those interested in the condition of the supply.

Municipalities where such general examinations of the public water supplies have been made in 1912 and advice given are as follows:

Angola
Avon and Geneseo
Deansboro
Fire Island (State Park)
Fulton
Hornell
Kingston
Letchworth Village (State Institution)
Mt. Morris
Mohansic State Hospital
Newark (State Institution)
New Hartford
Oneida
Poughkeepsie (Hudson State Hospital)

Typhoid Fever I

For the year 1912 the typhoid f
State is approximately 11.8 per 1
the lowest death rate for this diseas
is the period for which continuous
been recorded. It is approximatel
average typhoid fever death rate i
period, and approximately 52 per
rate prior to 1905, the date when t
Department of Health was comple
rate is generally accepted as the bes
tion of any community, this record
example of the practical results th
comparatively few years through
activity carried on systematically
organization.

As has been the practice in the p
to make thorough and prompt inve
rounding epidemics or the undu
Because typhoid is often traceable
associated with public water suppli
tems, these investigations have as
Engineering Division. In each c
pression of the epidemic were take
where it seemed necessary letters
transmitted to the local health aut
pleted reports indicating the steps
of the disease. In all cases compl
outlining the more permanent cha
prevent, as far as possible, a recu

During 1912 this Division was
breaks or the undue prevalence of
places:

Adirondack
Greenwood Lake
Highland
Hoosick Falls
Middletown

Investigation

fever death rate for the entire
100,000 population. This is
se for the last 28 years, which
is yearly death statistics have
ly 44 per cent lower than the
in the State for this 28 year
cent lower than the average
he reorganization of the State
ted. Since the typhoid fever
st index of the sanitary condi-
must be accepted as a striking
t it is possible to obtain in a
campaign of education and
with a trained and efficient

t special care has been taken
igations into conditions sur-
prevalence of this disease.
physical conditions closely
milk supplies, or sewer sys-
ule been carried on by the
prompt measures for sup-
ring the investigation and
nstruction or advice were
es in advance of the com-
taken to prevent a spread
eports have been prepared
which should be made to
ce of an outbreak.
ed upon to investigate out-
hoid fever in the following

hport
ling
nebeck
annah
shingtonville

Sewerage and Sewage Disposal

The work which the Engineering Division is called upon to perform under the provisions of the public health law with reference to the approval of plans and the issuance of permits for sewerage and sewage disposal, constitutes one of the more important as well as the larger part of its routine duties. The public health law requires in general that all plans for sewerage and sewage disposal systems be submitted to and approved by the State Commissioner of Health before they may be constructed or put in operation; and that he shall stipulate the conditions under which the discharge of sewage from such systems and of wastes from industrial plants into the waters of the State may be permitted.

In examining the plans for new systems of sewerage and sewage disposal for municipalities careful consideration must be given to the details of the design and the efficiency and adequacy of the systems as a whole from a sanitary engineering standpoint. Attention must also be given to the degree of purification of the sewage provided for and to the proper location of point or points of discharge, matters which necessarily depend largely upon the nature of the stream or watercourse receiving the sewerage or sewage effluent, the location of public water supplies that might be affected thereby and the location of other outlets of adjacent municipalities. Application for the discharge of industrial wastes or effluents thereof must also be given careful consideration with especial reference to the possible causation of a nuisance before permits allowing such discharge are issued.

During 1912 plans for sewerage systems, sewage disposal plants or sewer extensions and alterations were examined, reported upon and permits prepared in connection with the following places:

Albany
Albion (Western House of Refuge)
Amsterdam (Montgomery County Tuberculosis Hospital)
Auburn
Avon
Ballston Spa
Binghamton
Cattaraugus
Cheektowaga
Corning
Deerfield (S. J. Weaver)
Eastchester (T.)
Fire Island (State Park)

Frankfort
Franklinville
Freeport
Fulton (Fulton County Tuberculosis Hospital)
Glen Cove
Hamilton College
Harrison
Herkimer
Hobart
Hudson
Huntington (M. L. Scudder)
Ilion
Ithaca
Johnstown
Keuka College
Kings Park (State Hospital).
Larchmont
Lestershire
Lewisboro (Waccabuc Inn)
Long Beach
Madeline Lake (E. H. Litchfield)
Mamaroneck
Middleport
Mount Kisco
Mount Pleasant (Blythedale Home)
Mount Pleasant (Fairview Country Club)
Napanoch (Eastern New York Reformatory)

Permits were also issued durin of industrial wastes or sewage fr certain restricted conditions, in t

Beerston
Cedarville
Essex
Gardinier

Olean	Sacketts Harbor
Richford	Victory
Rosendale	Whitneys Point

In addition to the above work of examining plans and applications with reference to proposed sewerage systems and sewage discharge, considerable attention has been given to the conditions of existing systems of sewerage and sewage disposal which in many cases have acquired more or less extensive investigations. Reports setting forth the results of such examinations and making recommendations for the proper procedure to be taken in remedying any unsatisfactory conditions found to exist have been prepared and sent out. In some municipalities lectures and addresses have been given, and in others conferences held, for the purpose of furnishing information and advice pertaining to sewerage and sewage disposal.

Work of this nature has been carried on during 1912 in the following municipalities:

Cattaraugus	Nyack
Chappaqua	Patchogue
Dunkirk	Pearl River
Fayetteville	Rome
Fleischmann's	Rye
Freeport	St. Regis Falls
Griffin Corners	Schenectady
Hempstead	Spring Valley
Middleport	Ticonderoga
Mount Kisco	Wappingers Falls
Mineola	West Seneca
Millerton	Whitneys Point

Investigation of Stream Pollution

The question of stream pollution is, broadly speaking, closely associated with questions of water supply and sewage disposal. Either an improvement or a laxity in connection with any one of them involves a corresponding improvement or retrogression with the others. The laws governing the jurisdiction of the Department are however different in each case, and for this reason a differentiation must be made as to their classification, especially

with respect to what may be appropri
disposal and what under stream poll

Attention has already been calle
Public Health Law and the work o
with respect to the disposal of sewage
trial establishments, especially in con
and approval of plans and the issua
charge of sewage from sewerage
bodies. There are many cases of po
that do not arise from sewage discha
industrial sewer systems but which e
cific exemption under the Public I
source is from private sewage disch
ferently and under different provisio

These cases constitute a large clas
relative importance. Many of them
account of important interests inv
rights, or inadequacy of local ordi
Department in dealing with such ca
made, usually involving a local in
which a report embodying findings
prepared and furnished the local b
parties to guide them in properly
conditions.

Space will permit of a referenc
cases of stream pollution in the
reports were made by the Engineer
suitable action was taken by the
health boards in their abatement, a

Albany
Alden
Angola
Arlington
Bayshore
Bethlehem (T.), (2)
Canastota
Cazenovia
Corning
Dryden

Lyons	Rensselaer
Malone	Riverhead
Medina	Rye (2)
Millerton	Scriba Center
Newfane	Seneca Falls
Nichols	Sinclairville
Oyster Bay	Sloan
Painted Post	Tivoli
Pleasantville	Troy (2)
Port Jefferson (2)	Tupper Lake
Potsdam (2)	Wallkill
Poughkeepsie	Wawayanda (2)
Redfield	Westfield

Public Nuisances not Arising from Stream Pollution

Although the investigation of public nuisances created by the discharge of sewage and other wastes into streams of the State constitutes a very important part of the routine work of the Engineering Division, the ever-increasing number of local nuisances not arising from stream pollution which are referred to this Department by municipalities and individuals in all parts of the State during the past few years has made this work of almost equal importance. Many of them are, however, of a purely local nature and should be handled by the local boards of health which have full jurisdiction, under the Public Health Law, in matters of this kind.

Owing to the large number of these local nuisances, it has become necessary to refer many of the less important ones to the local health boards for action, the Department investigating and reporting on only such nuisances as are of a public nature, i. e., affecting a considerable number of persons, or which do not come entirely under the jurisdiction of the local authorities, or for particular reasons can not be properly handled by the local boards. Of the nuisances which have thus been taken up by the Department for action may be mentioned those arising from swamps and improper drainage facilities; emission of smoke and fumes from industrial establishments; improper maintenance and operation of rendering plants; improper method of garbage disposal; and insanitary conditions arising from inadequate sewerage facilities.

The municipalities of the State v
these nuisances have arisen and ha
partment for investigation and a
follows:

Akron
Albany (2)
Albion
Allegany
Altamont
Amenia
Arlington
Ashland
Auburn
Aurora
Avon
Babylon (3)
Bath
Bellmore
Bronxville
Brunswick
Canajoharie
Caroline
Carthage
Castleton
Catskill
Cattaraugus (2)
Central Square
Chappaqua
Cohoes (2)
Corning
Cornwall-on-Hudson (2)
Coxsackie
Dannemora
Dayton (3)
Dunkirk
East Syracuse
Elmira (4)
Elmira (T.)
Evans

Hilburn
Homer
Hoosick Falls
Jay
Larchmont
La Salle
Liberty
Matteawan
Nassau
Norwood
Nyack
Owego
Pawling
Philmont
Piercefield
Potsdam
Ravena
Richmondville
Rosendale
St. Johnsville
Silver Creek
Sloatsburg
Valatie
Warrensburg
Watervliet
Wellsburg
Western N. Y. Water Co

During the year many requests have been received for examination of insanitary conditions affecting the condition of public water supplies. In response to such requests considerable routine work has been done by the engineering division in addition to the complete or special examination of public water supplies. Such examinations have usually entailed a field inspection of certain special features, which have been reported upon and advice given to the authorities in charge or those interested in the condition of the supply.

Municipalities where such general examinations of the public water supplies have been made in 1912 and advice given are as follows:

Angola
Avon and Geneseo
Deansboro
Fire Island (State Park)
Fulton
Hornell
Kingston
Letchworth Village (State Institution)
Mt. Morris
Mohansic State Hospital
Newark (State Institution)
New Hartford
Oneida
Poughkeepsie (Hudson State Hospital)

the alleged public nuisance arising fron
an abandoned State slip or canal in the
Main street and Commercial Slip. The
tion were embodied in a report which
the Governor as provided by law.

In addition to this executive order,
sions of section 6 of the Public Health
have been referred to the Department
formation or advice which in every cas

Special Investiga

No work of a State Department
merely to routine duties. There will
of educational, research and special
will be incidentally necessary to the
or essential in order to cover subjects
specific laws. Laws usually embody
ments based upon actual experience
a field based on preventive measures
activities in advance of these necessitie
of defense to wider limits in the field

Space will hardly permit of my
these important lines of activities wh
neering Division. The more importa
will be referred to with brief descrip
tions of summer resorts, water suppl
gations of stream pollution, investiga
the securing of scientific data and t
in the suit of the State of New Yo
Jersey and the Passaic Valley Sewe
discharge of sewage into New York I
lines of educational work carried or

(1) Sanitary Conditions at Sur
investigating the sanitary conditions
ing houses was carried on during 1
appropriations available for this pu
perhaps no line of activity in the
portant in some respects to the pr

more fully warranted by the results accomplished than the protection of the recreation public through the supervision of the sanitary condition of summer resorts. It is believed that this work should be extended rather than curtailed for much ground still remains to be covered in this field of work.

In March, 1912, letters were addressed to the proprietors of some 328 summer resorts investigated during 1911, calling their attention to certain insanitary conditions at their hotels and requesting that steps be taken to correct such conditions. The original inspection of 122 of these resorts had been made in 1910 and the letters sent constituted second notices to remedy insanitary conditions at these places. The original inspection of the other 206 resorts had been made during the season of 1911, the total number of resorts inspected for the first time during that year being 304.

These 328 resorts were located at widely different points, the investigation having progressed so far that there were represented all but one of the thirteen districts into which the State has for convenience in carrying out the work been divided.

These districts are as follows:

I. Thousand Islands — St. Lawrence district
II. Fulton Chain — Big Moose district
III. Raquette, Tupper and Long Lakes district
IV. Saranac — St. Regis district
V. Lake Champlain district
VI. Lake George district
VII. Lake Pleasant — Saratoga Springs district
VIII. Western district
IX. Central — Finger Lakes district
X. Otsego Lake — Richfield Springs district
XI. Catskill — Albany district
XII. Southern district
XIII. Long Island district

It is unfortunate that lack of appropriations precluded a reinspection during the season of these 328 resorts in order to determine what steps had been taken to carry out the recommendations of the Department and that the progressive work of the Department in the investigation of additional summer resorts could not

be continued. Notwithstanding this, hc
gation of a general nature was made
two members of his staff, of sanitary c
Chain of Lakes and the St. Lawrence
inspection notices were issued in Nove
every summer resort in the Adirondac
and in the adjacent districts where i
inspections that sewage was still being
lakes and streams, such notices requiri
of the coming season provision be mad
of sewage.

(2) Investigation of water supplie
of the Department in the work of in
ditions of cities was discussed in m
was shown that in the case of twel
whose sanitary condition was careful
to 1910, the recommendations mad
public water supply.

It was by reason of the outcome o
sanitary conditions of cities undertal
1910 inclusive, and in order to exte
of accomplishing the greatest good
beginning with 1911 and continuin
investigations of cities were limited
the sanitary features connected wi
The work of investigation included
of vital statistics with respect to al
ing a bearing on the public health
the sanitary quality of the public
the mortality rate which the quali
sponsible for.

Such investigations and studies
following cities:

Batavia
Cortland
Glens Falls
Gloversville
Jamestown
Little Falls

During the year general notice was serv
of the municipalities, calling attention t
amended Public Health Law and reque
action it was proposed to take, to correct
ditions of sewage discharge which we
addition conferences were held with local
of these municipalities. These prelimina
ment were taken on account of the co
would be entailed in some cases by th
in order to give opportunity for volunt
authorities in making the necessary char
an "order to show cause."

As a result of the preliminary notice
local authorities some seven of the thi
taken up the necessary preliminary steps
for sewage treatment works. In som
have been submitted and approved and
been issued by the Department for the

(4) Investigation of shellfish poll
Aside from infected water and milk, in
ably plays an important role in the cont
typhoid fever among certain classes of
exact relation which these infected o
typhoid mortality is not only uncertain
cal and scientific reasons difficult of d

Numerous investigations have been
and federal authorities to determine
effect on public health in different lo
and abroad. Among these investigat
made by this Department in 1908 of
in the vicinity of New York city a
Island. The results of this investiga
the 1908 Annual Report of the Sta

During 1912 a second investigatio
was made by the Engineering Di
Jamaica Bay. This investigation
visions of section 161 of the Conse
report was not called for by the C

amount of scientific information and exp
request of the Attorney-General the serv
engineering experts of the Department

These services entailed a considerat
time of the Chief Engineer and Sp
of the Department during the latter p
1912, including a comprehensive study
tions of the harbors of the Atlantic se
connection with pollution of saline and
cal study of the effectiveness and enfo
between the United States and New J
submitted in connection with these fea
testimony of the Chief Engineer was p
1912.

The case is perhaps the most import
has arisen in the country, and there i
elaborate reports and testimony of th
represent one of the most valuable con
on the important subject of pollution

(6) Educational Work: Education
has been carried on by the Engineerin
three ways — by lectures and address
hibit at the State Fair at Syracuse; a
exhibit at county fairs.

The amount of educational work
dresses was considerably more during
year, some 33 illustrated lectures
having been given by members of th
ing the year. In addition to particip
Annual Conference of Health Office
tary Institutes for Health Officers a
Utica, addresses and illustrated lect
subjects have been delivered by the
municipalities throughout the State
pal authorities or of civic and edu
lectures have also been delivered by
Principal Assistant Engineer in th
and Public Health given at the Ne
College and at the College of Medi

The Sanitary Engineering Division exhibit, which is a part of the Department exhibit, at the State Fair at Syracuse, has come to be one of the regular and annual educational features of the Engineering Division. This exhibit consists largely of the display of plans, profiles, charts, photographs and other graphic illustrations representing the work of the Division in connection with public water supplies, sewerage and sewage disposal, stream pollution and summer resort inspection. One of the principal features of the exhibit, which has been shown now for a number of years, is a series of working models, in operation, representing various methods and types of sewage disposal works. These models attracted considerable interest and in connection with them brief lectures discussing the problem of sewage disposal and describing the constructive and operating features of the various types of sewage disposal works represented by the models were given by a member of the Engineering staff.

The attendance at the exhibit in 1912 and the interest shown by the visitors were greater than in any of the four years during which the exhibit has been shown. This fact is especially gratifying since it is a fair index of the increased interest in public health work which has been aroused among the citizens of the State.

In addition to the exhibit made at the State Fair, the Department this year made a new departure in presenting some of the essential facts of Public Sanitation to rural communities. With the co-operation of the State College of Agriculture at Cornell University, the Department was enabled to secure space at six county fairs and to exhibit there a specially prepared series of photographs, diagrams and maxims relating to sanitation. These exhibits in connection with which lectures were given by one of the members of the Engineering Division, attracted much attention and were a source of continuous interest to the many thousands who saw them.

There is room for much activity in improving the sanitary conditions of living on our farms and in our smaller villages, and it is believed that through these county fairs a new opportunity is afforded by which useful results can be accomplished and the purposes and aims of the Department more fully realized.

DIVISION OF LABORATOR

The courses of laboratory instruction State have been offered every week thro ing the scheme published on the last p nouncing the availability of the courses

Members of the Laboratory staff have lectures on preventive medicine, in the lished last year at the New York Homo and at the Universities of Syracuse and

More strictly scientific lectures on T and Vaccine have been delivered by m laboratory, on invitation, to the Roches and again as a continuation of the Academy of Sciences. In response to i the laboratory staff have addressed th meetings of the Washington County meetings of the Medical Societies of Monroe counties.

Bacteriologists of county laboratorie tories, have visited the laboratories o more times during the year, for revisic parison of their lines of work. A n cians have visited the laboratories at instruction in the use of antitoxins, a State institutions, and public health w also come to learn of the nature of th visits in increasing numbers are bei of health departments of cities and to

Routine Investigations for Purpos
Potable V

The efforts of this line of work hav atize the laboratory control of the State. During the year 1912, 5,200 made at the laboratories, an increas work of 1911, which was itself an the work of 1910. Of the total 5,2

ORATORY WORK

uction for health officers of the
ek throughout the year, follow-
last page of the Bulletin, an-
courses of instruction.
ff have contributed a number of
in the courses on hygiene estab-
Homoeopathic Medical College,
use and Buffalo.
on Theories of Immunization
by members of the staff of the
ochester Academy of Medicine,
the subject, to the Rochester
to invitation also, members of
the annual and semi-annual
y Medical Society; and also
f Genesee, Montgomery and

es, representing four labora-
of this Department, one or
n of their methods or com-
mber of interested physi-
various times for special
representatives of other
orkers of other States, have
e work done there. Similar
ng made by representatives
owns in this State.

es of Sanitary Control of
Waters

e been to ext[illegible]d and system-
public water supplies of the
sanitary wat[illegible] analyses were
e of 30.62 p[illegible] cent. over the
ncrease of 5[illegible] per cent. over
00 analyses, 2,800 were bac-

teriological examinations (an increase of 31.39 per cent. over the corresponding number of 1911, which was itself an increase of 36 per cent. over the numbers of the preceding year of 1910), and of the remainder, 2,400 were chemical analyses of the water of public supplies of the State (an increase of 30 per cent. over the corresponding work of the year of 1911), which was itself an increase of 69 per cent. over the work of the preceding year of 1910.

The public water supplies of 382 cities, towns and villages were examined during the year of 1912, and of these waters, one analysis was made for 27 of them, 2 analyses each for 19, 3 analyses each for 32, 4 analyses each for 43, 5 analyses each for 50, 6 analyses each for 59, 7 analyses each for 62, 8 analyses each for 11, 9 analyses each for 6, 10 analyses each for 12, 11 analyses each for 5, 12 analyses each for 6, 14 analyses each for 6, 15 analyses each for 3, 16 analyses each for 3, 18 analyses each for 8, 19 analyses each for 3, 20 analyses each for 2, and 21 analyses each for 2 supplies. One public water supply has been analyzed 22 times, another 23, another 24, another 25, 3 supplies have had 31 analyses each, 1 supply 34 analyses, another has had 40, and the supply at Ogdensburg has been submitted to the control of 99 analyses at the laboratory.

Comparison of these figures with those reported for 1911 will show the degrees of extension and system of the present control of public water supplies as now accomplished. It is felt, however, that a multiplication and extension of such work to at least five times the present amount is requisite before a sufficient amount of analytical data will be obtained for active knowledge and prompt correction of deficient qualities of these public supplies now existing.

The water supplies of 28 State institutions have been examined during the year. Nine institutions have had 1 analysis each during the year, 1 institution 2 analyses, 1 institution 5 analyses, 1 has had 6 analyses, 3 others 7 analyses, 3 have had 8 analyses, 1 has had 9 analyses, 3 have had 11 analyses, 1 had 13 analyses, 3 had 14 analyses, 1 had 15 analyses, and 1 institution has 16 sanitary water analyses during the year. A total of 195 water analyses of the domestic water supply of State institutions has

been made during 1912 at the laboratories
institutions is as follows:

Binghamton State Hospital, Bingham
Buffalo State Hospital, Buffalo
Craig Colony for Epileptics, Sonyea
Eastern New York Reformatory, Na
Gowanda State Homoeopathic Hospi
Hudson River State Hospital, Pough
Kings Park State Hospital, Kings P
Long Island State Hospital, Flatbush
Manhattan State Hospital, New York
Middletown State Homoeopathic Ho
New York State Custodial Asylum f
Newark
New York State Hospital for Crippl
West Haverstraw
New York State Hospital for the T
monary Tuberculosis, Raybrook
New York State House of Refuge, I
City
New York State Reformatory, Elr
New York State Reformatory for
New York State School for the B
New York State Soldiers and Sail
New York State Training School
New York State Women's Relief
Rochester State Hospital, Rocheste
Rome State Custodial Asylum, Ro
St. Lawrence State Hospital, Ogde
State Agricultural and Industrial
State Institution for Feeble-Minde
Thomas Indian School, Iroquois
Utica State Hospital, Utica
Western House of Refuge, Albion

Laboratory examinations of the
controlled by the State Reservation
previously undertaken, have been c
including sanitary, chemical and ba

teriological examinations (an increase of 31.39 per cent. over the corresponding number of 1911, which was itself an increase of 36 per cent. over the numbers of the preceding year of 1910), and of the remainder, 2,400 were chemical analyses of the water of public supplies of the State (an increase of 30 per cent. over the corresponding work of the year of 1911), which was itself an increase of 69 per cent. over the work of the preceding year of 1910.

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total of 61,117,500 units, has been dis
1912; a distribution, which in view of
morbidity of this disease in our State t
pansion of the resort to the use of the St
ment of diphtheria. An increased use c
shown for 1912, during which time the
ages of 1,500 units each was distributed

Typhoid vaccines have been made and
purposes to three State institutions, to t
and a small amount of these same vacci
to county institutions.

The vaccines for the Pasteur treatme
made at the laboratories and kept in
1912. No method of distribution of the
determined upon and there are no appr

For the prophylaxis of ophthalmia
have been made and distributed this y

The increasing demand upon the labor
logical supplies, culture media, outfits,
report for 1911 with considerable insis
quite able to furnish all such material
quate appropriation to meet such exp
such supplies has been made and the in
less so great that the material is still su
strained resources will permit. Duri
volved the sending out of 4,109 sputum
test (Widal) outfits, and 15,000 blood
purchase the blood serum tubes alone
to the amount of the year's distributio
propriation of $3,000 for the expense
plies alone, would not be excessive
actually distributed.

THE DIVISION OF COMMU

This Division has continued its ef
ventive medicine, materially contrib
pression of outbreaks of communicabl
thereby preventing their introducti
possible spread throughout the State.

weekly control mineralogical analyses, to a total number of 944; of which 26 were complete mineralogical analyses; 4 of the mineralogical analyses of the essential mineral constituents; and 18 bacteriological and chemical sanitary analyses; and 932 control mineralization analyses, made weekly on a total of 31 springs at various but continuing periods throughout the year of groups of the 31 springs.

This amount of work contributed by the Laboratory division for the purposes and use of the Saratoga Reservation Commission, has taken the exclusive time and services of more than one-third of the technical staff of the State Hygienic Laboratory, at a period when that entire laboratory is undermanned and under-equipped to a most serious degree by reason of the insufficiency of its maintenance appropriations.

Diagnostic Examinations for the Detection of Contagious Diseases and the Control of Quarantine

The increase of the work of laboratory diagnosis is shown by the total numbers, by years; starting for instance with the year 1908 with a total number of specimens examined that year of 2,938, the increase each succeeding year is as follows: 1909 — 3,695 specimens; 1910 — 8,895 specimens; 1911 — 10,482 specimens; and 1912 — 11,550 specimens. Of the total specimens of 1912, examined for diagnosis, 8,000 were blood serum cultures examined for diphtheria detection; 2,531 sputa were examined to determine the presence of tubercular bacilli. There were 782 specimens of blood from suspected typhoid patients tested for the Widal reaction.

Preparation and Distribution of Bacteriological Supplies and Products, Sera, Vaccine, etc.

By reason of the restriction of the supply of animals for the antitoxin stables, for the greater part of the year, the production of antitoxin has been seriously interrupted there this year, and the routine distribution of antitoxins has been maintained only by drawing upon reserves for such emergencies. The equivalent of 40,745 packages of 1,500 units each of diphtheria antitoxin, a

Pneumonia has been attacked and i
cautions are being taken by the physici
occurrence of contact infection in th
instruction regarding pneumonia has b
the hands of the health officers for di
palities. The general health of the S
has been remarkably good, and it is
serious epidemics of the more comn
have occurred, although poliomyeliti
caused considerable uneasiness by it
Buffalo and adjoining territory. The
pears to have been followed by a d
malady, which unfortunately cripples
A careful study of this outbreak ha
observers, and it is believed that co
store of knowledge regarding this dis

Scarlet Fe

This acute disease has been greatl
the cases have been extremely mild
quiring the services of a medical off
ment of Health in order to determin
the quarantine measures necessary t
infection.

Scarlet fever had its greatest pre
March when more than 3,000 cases w
lowest point in August when but 42
was increased in the month of Sept
the reopening of the schools after t
lowed by an increasing number of re
the need of medical inspection of
prevent the entrance of this diseas
cable diseases which are chiefly spr
of the pupils in our schools.

Smallpo

The control of smallpox has bee
by the opposition to vaccination disp

and it is to be noted that pre-
ysicians to prevent the frequent
n this disease. A circular of
has been prepared and placed in
or distribution in their munici-
the State during the year 1912
it is gratifying to note that no
common communicable diseases
yelitis (infantile paralysis) has
y its prevalence in the city of
The advent of cold weather ap-
a decreased prevalence of the
les for life many of its victims.
has been made by competent
considerable additions to our
disease will result.

Fever

y reduced in prevalence and
in character, frequently re-
er from the State Depart-
the diagnosis and enforce
prevent the spread of the

lence during the month of
ere reported, and reached its
cases were reported, which
ember to 466.
e summer vacation. As is usual.
ported cases, plainly showing
school children, not only to
but of the other communi-
ad through the close contact

greatly hampered, not only
yed in many municipalities.

but also by the extremely mild character of the eruption which has frequently led to error of diagnosis and consequent exposure of many persons to the contagion before the aid of this Department was invoked and the correct diagnosis made.

Smallpox has been prevalent since the latter part of the year 1911, when more cases occurred in the month of December than during the preceding eleven months of that year. The outbreak continued into the year 1912, when 173 cases were reported in January and 88 cases in February, continuing with decreasing prevalence until the latter part of the year when a number of cases were reported from Hancock, Delaware county, the outbreak gaining considerable headway owing to the fact that the disease was not recognized as smallpox until a widespread exposure had occurred. Vaccination had been neglected by a great many of the inhabitants of that section, who were loath to believe that the malady was variola until several severe cases of the semi-confluent type occurred, when they flocked to the physicians demanding vaccination. The wholesale vaccination which was then practiced, together with the isolation of all known and suspected cases, has resulted in a checking of the epidemic in that section of the State.

The same difficulty in controlling the disease has been encountered in the northern counties of the State, the disease starting from Mineville, Essex county, where it was diagnosed as chickenpox until the consulting dermatologist of the State Department of Health visited there and pronounced the eruptive fever, from which many of the people were suffering, to be variola. As in Delaware county, there has been considerable opposition to vaccination encountered. Sporadic cases of smallpox have been reported from all sections of the State, but prompt isolation of the patients with vaccination of all exposed persons has prevented a general epidemic throughout the State.

Ophthalmia Neonatorum

The efficacy of preventive measures has been fully demonstrated in the control of this disease, inasmuch as not a single case of ophthalmia in the newborn has been reported where the preventive solution furnished by the State Department of Health was used in the eyes at the time of birth. This, together with the hearty

co-operation of accoucheurs, has re
number of cases of this disease to si
ing demands are being met with su
fully proving that not only the phy
are using the preventive solution f
cases resulting in blindness have be

Whooping C

The control of this disease, owin
the infective period, presents almos
the circular of instruction issued l
distribution in communities where a
have borne fruit, as parents and gu
to the danger of the disease which
children, and protect their young fro
disease.

Pellagra

One case which resulted fatally
State. No other cases have been re

Poliomyel

This disease from which but 137 c
year 1911 was apparently eliminate
cases were reported during the mon
became prevalent early in 1912, be
frequency during January, 1912, v
and continuing prevalent with 25 to
until the warm weather of July, w
These were increased to 223 report
the maximum in September, when
gradually decreasing in prevalence
cases were reported; as usual this d
dormant during the winter months
poliomyelitis, which has its greate
summer months, is practically a di
cold climates rather than of countr
ditions are mild.

but also by the extremely mild character of the eruption which has frequently led to error of diagnosis and consequent exposure of many persons to the contagion before the aid of this Department was invoked and the correct diagnosis made.

Smallpox has been prevalent since the latter part of the year 1911, when more cases occurred in the month of December than during the preceding eleven months of that year. The outbreak continued into the year 1912, when 173 cases were reported in January and 88 cases in February, continuing with decreasing prevalence until the latter part of the year when a number of cases were reported from Hancock, Delaware county, the outbreak gaining considerable headway owing to the fact that the disease was not recognized as smallpox until a widespread exposure had occurred. Vaccination had been neglected by a great many of the inhabitants of that section, who were loath to believe that the malady was variola until several severe cases of the semi-confluent type occurred, when they flocked to the physicians demanding vaccination. The wholesale vaccination which was then practiced, together with the isolation of all known and suspected cases, has resulted in a checking of the epidemic in that section of the State.

The same difficulty in controlling the disease has been encountered in the northern counties of the State, the disease starting from Mineville, Essex county, where it was diagnosed as chickenpox until the consulting dermatologist of the State Department of Health visited there and pronounced the eruptive fever, from which many of the people were suffering, to be variola. As in Delaware county, there has been considerable opposition to vaccination encountered. Sporadic cases of smallpox have been reported from all sections of the State, but prompt isolation of the patients with vaccination of all exposed persons has prevented a general epidemic throughout the State.

Ophthalmia Neonatorum

The efficacy of preventive measures has been fully demonstrated in the control of this disease, inasmuch as not a single case of ophthalmia in the newborn has been reported where the preventive solution furnished by the State Department of Health was used in the eyes at the time of birth. This, together with the hearty

which occasioned considerable uneasi
the services of medical officers from
bers of the engineer's staff were fr
in determining the source of the in
to be due to an impure water suppl

Among the more notable outbrea
Corning, Steuben county, and at
The epidemic at Corning assumed a
the cases were as a rule of the mil
not great. A full report of this o
report of the Engineering Division.

Frequent evidence of contact infe
sity of maintaining a modified qua
strated. The greatest prevalence o
the month of August, when 997
month of least prevalence was June
ported. There were 8,536 cases re
8,083 cases reported in the year 19
cases were reported, although every
followed up in an endeavor to secu

Tetan

During the year 1912, 49 cases
Several of the cases followed vacc
gation in each case was made
gist, Dr. F. C. Curtis, who secure
used and forwarded the same to th
Service at Washington, D. C., w
together with inoculation of guin
obtained. In no instance has the t
vaccine virus, although every tes
these cases or any others of the g
common use.

During Dr. Curtis's investigatio
post-vaccinal tetanus that others t
were vaccinated at the same time
same calf and distributed in the sa
as they had no tetanus it is clear

...NT OF HEALTH

...asiness and called not alone for
...m this Division, but also mem-
...frequently called upon for aid
...infection, which is often found
...ely.
...reaks may be mentioned that at
...t Middletown, Orange county.
...d alarming proportions, although
...nild type and the mortality was
... outbreak will be found in the
...n.
...fection is found, and the neces-
...arantine has been fully demon-
...f the disease occurred during
... cases were reported, and the
..., when but 278 cases were re-
...ported in the year 1910, and
...1, while this year but 6,713
...umor of the disease has been
... full reports.

...tanus have been reported.
...u, but a careful investi-
... the consulting dermatolo-
...samples of the vaccine virus
...United States Public Health
...ere culture tests were made
... pigs and a negative result
...tanus germ has been found in the
... has been applied, either in
...lymph now in
... all of our recent
...ted with tetanus
...athered from the
...ts, and inasmuch
...e of the infection

was other than the vaccine virus. The anti-tetanic serum distributed free to physicians by the State Department of Health has been extensively used, not only as a prophylactic but also as a curative agent. Probably owing to the fact of its general use as a prophylactic is due the fact that but one case of tetanus is reported as following a Fourth of July injury.

Pneumonia

The measure of quarantine and isolation of all cases of pneumonia advised by the State Department of Health has resulted in a diminution of the number of contact cases from this disease, with a corresponding reduction in the number of deaths. The circular regarding the infectious nature of pneumonia has been freely distributed.

Tuberculosis

The campaign for the prevention and suppression of tuberculosis has been carried on energetically. Lectures have been given by the representatives of the Department; the tuberculosis exhibit has been shown as frequently as funds would permit; much literature regarding the prevention of the disease and the care of those affected has been freely distributed, resulting in the establishing of tuberculosis hospitals by the supervisors of several counties and the introduction of resolutions regarding the same in many other municipalities. It is noteworthy that several of the fraternal societies and insurance companies have established sanatoria for the care of their consumptives. The larger cities are well equipped both with inspectors and visiting nurses to enforce the tuberculosis law, but the rural districts are somewhat lax in regard to its enforcement.

Medical Officers

The aid of the medical officers has been more frequently requested by the health officers in cases of disputed diagnosis, and the promptness with which this Department has responded to all such requests appears to have been fully appreciated by the health officers who are handicapped in their efforts to conserve the public

health and find that they are freque
the assistance of the State Departm
maintaining of quarantine over com

Special investigations of outbreak
eases have been made by the medica
tracing the source of the infection, t
ment to eradicate the same and pr
infection.

State Institu

The inmates of the State instituti
rule in their freedom from the conta
although several epidemics have bee
worthy are here mentioned.

Diphther

Diphtheria carriers have been a
the superintendents of the State in
State Agricultural and Industrial
Syracuse State Institution for Feel

Malaria

Appears to be epidemic at the Hu

Trachom

An outbreak of this disease occu
Training School for Girls, Hudson
throughout the institution, although
by the officials of the institution who
tions of the Department's Consul
ing the outbreak 264 cases were repo
reported from the Training Sch
The cases are extremely mild
the chronicity of the disease, a
treatment its frequent recurrence in
no relaxation of the precautionary

Typhoid Fever

An outbreak of typhoid fever at the Central Islip State Hospital was traced to a carrier. An explosive outbreak of typhoid fever occurred at the Craig Colony for Epileptics during the month of April when 15 cases were reported as having their onset on April 24, 1912. The disease was confined to these cases.

Infant Mortality

The number of deaths during 1912 under one year have in some of our cities greatly exceeded the number reported last year, although the returns are not complete for the year 1912. This is the more remarkable when we take into consideration the fact that the most painstaking efforts are made by these cities to secure a clean and wholesome milk supply for their citizens.

Premature births, malformations and congenital debility cause practically one-eighth of the infant mortality under one year.

Bronchitis, broncho-pneumonia and pneumonia cause one-twenty-fifth of the deaths under one year.

Syphilis is a too frequent cause of death in children under one year, and it is probable that many of the deaths classed as congenital debility are in reality specific in character and should rightfully be charged to syphilis.

Whooping cough is charged with an average monthly fatality of seventeen, while measles has averaged eight deaths a month during the year.

Scarlet fever is almost a negligible disease under one year, while diphtheria claims but an average of 3.7 monthly.

DIVISION OF PUBLICITY AND EDUCATION

Monthly Bulletin

The regular issue of the Department's Monthly Bulletin continues to be an important feature of the work of this Division, and indeed of the Department's activities as a whole, for in it is recorded, month by month, a brief account of the Department's work, both routine and special.

The May issue appearing just at the beginning of summer, was appropriately used as a special number containing a symposium on

Infant Mortality and Infant Vitalit
Mortality in New York State;" "Sta
"A Campaign to Save the Babies;" "
Vitality;" "Rural Hygiene and Infa
Principles in Infant Feeding;" "R
Infantile Disease;" and "Dentition a

The September and October issues
given up to resumes of the most imp
read at the sessions of the America
and the International Congress on I
Washington, which were much app
officers who were unable to attend the
public health gatherings.

The Bulletin has also contained re
of epidemics and of public water sup
these, while dealing with local prob
value, for the principles involved
from them are applicable in many o

Other Public

New editions of the many circular
Department are constantly required
prepared during the year may be r
The Care of the Baby, Mouth Hyg
circulars of instruction for boys and
Hygiene.

The Annual Report for 1911 and
Annual Sanitary Conference were e
sion.

Sanitary Institutes at Poughk

A very successful Sanitary Insti
health officers, was held in Poughkee
tations to attend this Institute wer
in the counties bordering on the
and New York, and also to all me
the latter invitations being sent

boards. The response was very gratifying, for it has to be borne in mind that practically all of the health officers are physicians in active practice liable at any time to have patients whom they cannot conscientiously leave for a day or more; those who do attend the Institute lose the professional fees they would gain by remaining at home, while a good number have to pay their own traveling and hotel expenses. The Commissioner of Health made a special appeal to boards of health to assume these expenses and learned with pleasure that the suggestion was followed in quite a number of instances. The sessions were held in the Vassar Brothers Institute, and the program was as follows:

MARCH 7 — MORNING SESSION, 10 A. M.

Dr. W. S. Magill, Director of State Laboratories, Dr. W. A. Bing, Bacteriologist, and Mr. L. M. Wachter, Chief Sanitary Chemist, were on hand prepared to demonstrate any laboratory procedure of interest to health officers.

AFTERNOON SESSION, 2 P. M.

Special Laboratory Demonstrations:

By Dr. W. S. Magill.

a. How to collect samples of water.
b. The taking of specimens from throat for examinations for diphtheria infection.
c. The taking of blood for examination for typhoid infection.
d. Collection of stools.
e. Laboratory methods of examination.

Brief Talks:

Bacterial Diagnosis by the State Laboratory.
Dr. W. A. Bing.
Investigations and Examinations of Water Supplies.
Mr. L. M. Wachter.
The Use of the State Laboratories to Health Officers and Physicians.
Dr. W. S. Magill.

MARCH 7 — EVENING SESSION

Informal Talk:

Eugene H. Porter, M. D., State Com

Illustrated Lecture:

The Prevention of Infant Mortality.
H. L. K. Shaw, M. D., Consul
Department of Health.

MARCH 8 — MORNING SESSI

Brief Practical Talks:

Efficiency in the Control of Comm
Wm. A. Howe, M. D., Deputy
Rural Sanitation.
Mr. H. B. Cleveland, Chief As
Pure Water, Pure Air, Pure Food
Mr. Theodore Horton, Chief
Legal Questions in the Work of a
Mr. A. H. Seymour, Secret
Health.

AFTERNOON SESSION

Tuberculosis Clinic:

Conducted by Dr. A. H. Garvin,

The illustrated lectures by Dr.
Pediatrician of the State
Infant Mortality, were exc
appreciated. This feature
Tuberculosis Clinic condu
of the Raybrook State H
included in the program
local physicians.

A sanitary institute for the benef
mung and the surrounding countie
Elmira Academy of Medicine on
28 and 29.

The program included all the subjects treated at the Poughkeepsie Institute with the exception that instead of a session devoted to the discussion of tuberculosis, an afternoon was given up to the consideration of the subject of milk. Prof. Veranus A. Moore of Cornell University, gave an invaluable talk on tuberculosis in cattle, this being followed by an instruction on the hygiene of milk production and distribution.

The attendance was gratifyingly large and the Department was very much pleased at the response shown by the health officers to its efforts.

Another Sanitary Institute was held at Utica on May 23, and 24, and was well attended by health officers and members of boards of health from the surrounding towns and villages. The program followed differed only in slight detail from that prepared for the Poughkeepsie and Elmira Institutes.

Twelfth Annual Sanitary Conference

The Health Officers' Conference held at Syracuse during the first week in December, 1912, set a record that it will be hard to beat. The attendance was good at all of the sessions, the interest was well sustained until the chairman's gavel fell for the last time, the speakers were all on hand and, as far as time permitted, there was good discussion of the topics assigned.

The subjects discussed at the first session were "The Health Officer and the Tuberculosis Law" by Mr. Homer Folks, Secretary State Charities Aid Association, and "The Control of Syphilis and Gonorrhea" by Dr. J. N. Hurty, Secretary, State Board of Health of Indiana; Dr. Powhatan S. Schenck, Health Commissioner of Norfolk, Va.; Dr. Guy S. Kiefer, Health Officer, Detroit, and Dr. John L. Heffron, Dean, Syracuse University Medical School. Each of the out-of-state speakers told of something accomplished under his jurisdiction, either by education or regulation in some form or other, and if suggestions made by them and by Dr. Heffron on behalf of physicians, were carried out in the various municipalities in this State, we should not have to wait long for an improvement over the present condition of affairs.

On the morning of December 5, the cit:
those from towns and villages held separate
health officers listened to a symposium on
Food Supplies," participated in by Dr. F. B.
F. M. Meader of Syracuse, and Mr. The
Engineer of the State Department of Health
presented at this meeting were "The He
Work," by Dr. John S. Wilson of Poughk
tary Survey" by Mr. M. N. Baker, Edit
News.

The village and town health officers were
time the "Control of Communicable Dise
den, Surgeon U. S. Public Health Servi
Gowanda, and Mr. John L. Rice, Syracu
the speakers. Prof. H. N. Ogden, Corn
the subject of "How to Effect Improven

Mr. Frederick L. Hoffman, Statistici
Company, opened the Friday morning se
of "The Rural Death Rate of the Sta
was followed by an able paper by Dr.
Assistant Surgeon, U. S. Public Healt
Poliomyelitis," in the discussion of w
Consulting Orthopedist of the State D
Dr. Edward Clark of Buffalo, partici
Shaw of Albany, Consulting Pediatrici
urged the health officers to organize i
paigns for "The Prevention of Infa
was taken of the reading of "The Te
by Health Officers," by Dr. James
State Hospital Commission, to point
arise in the carrying out of this sectio

On Wednesday afternoon, Decem
noon, December 6, a Tuberculosis C
cuse University Medical School, th
ducted by Dr. H. B. Doust, Directo
pensary, and on Friday by Dr.
Medicine.

A goodly number of health offic

invitation extended by Dr. F. M. Meader, Bacteriologist of the Bureau of Health, to witness a series of demonstrations in the City Laboratory on both Wednesday and Friday afternoons. Dr. Carroll demonstrated the Determination of Bacteriological, Fat and Dirt Content of Milk, and the recording of the Specific Gravity; Mr. George Hannett explained the "Method of Keeping Records in the Department of Milk Inspection." Dr. Carroll showed the Examination of Blood for Bacillus Tuberculosis by the Antiformin Method; and Dr. Meader illustrated the Detection of a Typhoid Carrier. Mr. John L. Rice discussed the Standardization of Disinfectants, and Dr. F. E. Engelhardt talked on Detection of Strychnine.

The State Hygienic Exhibit was displayed throughout the week in the Assembly Hall in the Municipal Building, and was visited not only by the Health Officers, but also by many Syracusans.

Publicity at the State Fair

As in previous years the department took occasion of the holding of the State Fair at Syracuse during September to exhibit maps of the State with colored pins indicating the occurrence at the respective places of some preventable communicable diseases, also diagrams and tables prepared from data furnished by the division of vital statistics, and plans and bird's eye and sectional views of water and sewage purification plants. A large amount of printed matter issued by the department was distributed.

Exhibit at the International Hygiene Congress

In connection with the International Congress on Hygiene and Demography an exhibition was opened to the public for three weeks in which were shown what various states, municipalities, and organizations in the United States were doing for the betterment of public health. New York State came well to the fore; roughly estimated, exhibits from the Empire State gathered by the special committee appointed by Governor Dix, consisting of Dr. H. L. K. Shaw, Dr. Joseph D. Bryant, Dr. Luther H. Gulick, Dr. Edward T. Devine, and the State Commissioner of Health, occupied about a fourth of the available space. The exhibits were grouped according to subjects:

I. Vital statistics and demography
II. Growth and nutrition; food
III. The hygiene and infancy of childhoo
IV. The physiology and hygiene of exer
V. Housing
VI. Industrial and occupational hygiene
VII. Communicable diseases
VIII. State and municipal hygiene
IX. Care of the sick; life saving
X. Hygiene of traffic and transportatic
XI. Sex hygiene

The State department's exhibit consist photographs showing types of and locatio water purification plants, and the distric gation of summer resorts. There was York State showing death rates from t the installation of filtration systems in c tric chart showing great reduction in t 1911. A model of one cell of the Alba a mechanical water filter. Photograph control service, water analysis, prepa rabies antitoxin, and of diagnostic and eral charts and maps showing the distr pared under the supervision of Prof. W University. Electric charts showing all causes per total births; another sh from ten principal causes to total de giving number of preventable deaths and charts showing the prevalence, m the various communicable diseases. the decrease in death rate from ten hibit of the publications of the depar lecturers and titles of lectures given tion picture machine was installed, a pictures were given; an automatic s slides used by the department in it collection of essays on oral hygiene listened to lectures given under th

Models showing abnormal conditions of the mouth due to adenoids, thumbsucking, etc. Automatic stereopticon with slides illustrating structure, formation and development of teeth. Pamphlets describing the proper care of the teeth and the results of neglect of teeth.

During the afternoon and evening of each day popular illustrated talks on phases of public health work were given in a lecture hall, among the speakers being the director of the Department's Division of Publicity and Education.

Four awards of merit were given the New York State Exhibit for general excellence in the preparation and presentation of the material shown.

County Fair Health Exhibit

A small public health exhibit was shown during the past summer at a series of county fairs by the State Department of Health, acting in co-operation with the New York State College of Agriculture at Cornell University. The area covered by the exhibit was 9 ft. 6 in. wide by 7 ft. 3 in. high. When the space available took the shape of a booth, two large panels, each 3 ft. by 8 ft. were displayed, bearing appropriate lettering. For the side walls of the booth a number of frames of the tuberculosis exhibit of the Department were used.

The exhibit was set up and shown at county fairs as follows: Fulton, August 12-17; Warsaw, August 19-23; Moravia, August 27-30; Branchport, September 3-8; Albion, September 11-14; Batavia, September 18-21.

A special circular entitled "Health Hints for Country Householders," was distributed at the fairs; at Batavia 1,750 of these were put in farmers' wagons. The exhibit and special circular were produced under the direction of Prof. H. N. Ogden, of Cornell University, and the Division of Publicity and Education of the Department, and the former was in charge at the county fairs, and was called upon to answer many questions relative to ventilation, diphtheria antitoxin and adenoids. Antagonism to vaccination was frequently voiced at the fairs and showed the need for educational effort in this direction. It is estimated that the exhibit was visited by not less than 30,000 people.

Public Health Weeks at Albany a

A week of meetings for the discussion (was held in the new Education Building week October 21-25, under the auspices of of Health. The exhibit that was prepared tional Congress on Hygiene and Demogra displayed in the museum hall on the top Education Building, and was viewed b citizens. Large audiences also assembled of the building to listen to the various addresses. The program was as follows:

MONDAY, OCTOBE

Opening of Exhi

Addresses by Governor John A. Di Ewan, Commissioner of Education A State Commissioner of Health.

TUESDAY, OCTOB

Afternoon

Illustrated lecture " Carriers of Di Department of Health.

Evening

Women's Night — Address by D York, on " Personal Hygiene," and York, on " Child Welfare."

WEDNESDAY, OC

Afterno

Illustrated lecture, " Care of the White, State Department of Healt

Eveni

Civic Night — Addresses by York, " City Planning; " Mr. H nomic Problem of Health ; " and York, " The Clean City."

THURSDAY, OCTOBER 24

Afternoon

Illustrated lecture, "Modern Care of the Insane," Mr. T. E. McGarr, Secretary, State Hospital Commission, and "Study of Defectives," Dr. Hall, State Board of Charities.

Evening

Physicians' Evening — Addresses by Dr. W. Gillman Thompson, "Prevention of Occupational Diseases;" Col. L. Merwin Maus, U. S. A. Medical Corps, "Sex Hygiene in the Army," and Dr. Ira S. Wile, "Prevention of Venereal Diseases."

FRIDAY, OCTOBER 25

Afternoon

Address, "Welfare Work Among Employes," Dr. Louis I. Dublin, Metropolitan Life Insurance Company.

Evening

Labor Night — Addresses by Mr. John S. Whalen, Deputy Commissioner of Labor, "The State Department of Labor and Its Relation to Industrial Diseases."

At a number of meetings there was a display of motion pictures dealing with public health topics.

A series of public meetings was held in Syracuse during the week that the Annual Sanitary Conference was in session there. The program for the week was as follows:

MONDAY, DECEMBER 2

For Wage-earners

Under the auspices of Syracuse Central Trades and Labor Council, Mr. John B. Gafney, presiding. Addresses by Commissioner Williams, State Department of Labor, and Mr. Paul E. Illman, Secretary, Syracuse Associated Charities.

TUESDAY, DECEMBER 3

For Women

Mrs. Frederick R. Hazard, presiding. A
Charles W. Hargitt, on "Heredity and
Elizabeth Hamilton Muncie, Brooklyn, on
and Motherhood."

WEDNESDAY, DECEMBE

General Meeting

Dr. Edward J. Wynkoop, presiding.
W. Freeman, Assistant Commissioner o
ginia, on "The Interest of the Public
Dr. W. S. Magill, Director of the Stat
Importance of the Public Care of Food

THURSDAY, DECEMI

For Women

Miss Anna S. Huntington, presidin
L. K. Shaw, Consulting Pediatrician, S
Albany, on "Saving Babies," illustrat
Illustrated lecture for medical stude
cuse University Medical School, at 5
Statistics."

FRIDAY, DECE

For Men

Mr. H. W. Jordan, presiding.
New York, Director of the Division
State Department of Health, subj
illustrated by stereopticon.

Talks to School Children: Thr
partment of Public Instruction, t
and "Carriers of Disease," were
children on the afternoons of Dece

Motion Pictures: A popular and instructive feature of the public health week was the showing, twice daily, of motion pictures, all dealing with some phase of public health activity. Among the subjects were: "A New Lease of Life," illustrating the work of Raybrook State Hospital for Incipient Tuberculosis; "From Cow to Consumer;" "Toothache," illustrating the value of school dental clinics; "On the Trail of the Germs;" "The Visiting Nurse;" "The Fly Pest;" "Boil Your Water;" and "The Man Who Learned," illustrating the advantages of the sanitary control of milk supplies.

Public Lectures

The public lectures, illustrated by lantern slides, prepared by this Division, have been given upon request many times during the year in different localities.

Requests for the lectures on Mouth Hygiene and the Care of the Teeth received from schools and similar institutions have been met as far as possible. Among the municipalities visited by the lecturer on this subject may be mentioned: Theresa, Carthage, Watertown (twice), Waterloo, Elmira, Victor, Seneca Falls, Syracuse (twice), Auburn, Gloversville, Newark, Corning, Rome, Herkimer, Troy, Johnstown, Oneida, Albany, Binghamton, Geneva, Ithaca, Little Falls, Malone, Amsterdam, Fayetteville, Saranac Lake, Lake Placid, Tupper Lake, Chateaugay, Brushton, Rochester, Buffalo, Oswego, Albany (twice), Cape Vincent, Penn Yan, Lyons, Clyde, Savannah, New Paltz, Port Jervis, Middletown, Goshen, Skaneateles, Monroe, Chester.

At several of these places lectures were given at a number of schools in the city.

This feature of the Department's educational work has been highly commended, not only by the school authorities, where the lecture has been given, but by various State and National dental and public health associations.

Sex Hygiene Lectures

The State Department of Health has taken the first step in the inauguration of a State-wide campaign of education among women and girls in the important subject of sexual hygiene and

the prevention of the disastrous diseases so
sexual life. This educational work will
lectures, circulars, exhibits, etc., and will
operation with women's organizations, such
W. C. T. U., State associations of women's
and women church workers. It is also p
working in industrial establishments.

In view of the increasing prevalence of
the fact that cancer so often attacks one
organs of the female, it is proposed to in
campaign some lectures dwelling upon th
of prevention and necessity for early skil
In this particular phase of the subject th
will have the co-operation of the New
oratory.

To carry on this educational work a
cians have been appointed special lectur

Teaching of Public Health and Sanit

Believing that the average young d
too much from the standpoint of people
from which they are suffering and too
of individuals to be protected from di
from giving disease to others, the St
has, with the co-operation of the deans
in the State of New York, formulat
curricula of these schools a systemat
public health and prevention of disea

Some of the ten medical colleges
been doing very commendable work
past few years, but it is now propos
in formulating a course of study to be

The lectures of this course will b
of the staff of the individual college
of the State Department of Health
representatives of the local city hea

This educational work among me
upon the practice of their professio

affording great possibilities of usefulness and as the beginning of a step which will lead to great improvement in the general public health throughout the State. It will give the young men a broader outlook in their profession and will insure that every one will have the opportunity to acquire at least the rudiments of public health work, including the relation of the physician to local boards of health and health officers, and a knowledge of modern methods of prevention of the spread of communicable diseases and at the same time it will furnish some training along the lines necessary to be acquired by those physicians who intend to become health officers.

Public health work in this country and in this State has been hampered by the fact that no means have existed for the training of health officers. The doctor taking up public health work has had to learn his duties after receiving his appointment and has had to acquire a knowledge of how to perform them as best he could. The course of instruction which it is planned to give in the medical colleges of the State will not, of course, be as complete and thorough as is really necessary for the training of efficient health officers, such as is given to public health workers in the more advanced countries of Europe, but it will be a step in the right direction, and the doctors of the future who have taken the course will not be handicapped to so great a degree as the present generation of health officers has been.

Health Officers Traveling Library

The small traveling library of standard works on public health subjects has been loaned to health officers as called for, the requests for the same coming in with such frequency as to maintain a "waiting list" practically all the time. Several sets of the books are owned by the Department, each set consisting of the following works:

Diseases of the Skin and Eruptive Fevers, by Schamberg
General Bacteriology, by Jordan
Pulmonary Tuberculosis, by Pottenger
Principles of Sanitary Science and Public Health, by Sedgwick
Sewage Disposal, by Kinnicutt, Winslow and Pratt
Water Supply, by Mason

DIVISION OF VITAL

There was a great decrease in the n
of the two years preceding. The savi
3,500. It is distributed over the en
has fewer deaths with the exception
the total in these is not far from tha
to some 500.

Taking the December preceding so
cold weather, hot weather, spring and
in the last three winter months, 37,52
before, 39,221 deaths — a saving of 1
months of 1912 there were 39,126, and
death — a saving of 1,400. In the thre
there were 33,460, and in 1911 there v
1,300. In the autumn months the deat
together, so that there was a saving of 1

Compared with 1910 the mortality
smaller by 5,000. In the three winter
450; in the spring months it was less
summer months it was very much less,
autumn months there were nearly 1,3
than in 1910.

Crediting the years with their esti
have constantly increased, the death ra
it has ever been, 14.8 per thousand po
15.5; in 1910, 1909 and 1908 it avera
17.5; and in 1904 it was 18.0.

The spring months had the greatest
them the winter months; the summer
fewest of all the fall months. There w
the spring than in the winter, and 5,600
the spring, while in the autumn they we
proportion occurred in 1911 and 1910
76,000 deaths in the cold weather mo
in the warm weather months.

…al Statistics

…he mortality from that of either
… saving over 1911 is more than
…he entire …
…ption of year ; for every month
…m that of last and October; and
year and amounts

…ding so as to have the seasons of
…ing and fall compared, there were
…s, 37,528, and in those of the year
…ng of 1,700. In the three spring
…26, and in 1911 there were 40,600
…the three summer months of 1912
…there were 34,801 — a saving of
…e deaths in both years were near
…g of less than 100.
…rtality this year was likewise
…nter months it was a saving of
…less this year … 450; in the
…8, almost 3,0… …0; and in the
…300 fewer de… …aths this year

…timated popu…
…ate this year …tions which
…pulation. In … is the lowest
…raged 16.2; in 1911 it was
1907 it was
…t number of
…er months
…e were 1,600 …eaths, next to
…00 fewer in t… …me next. and
…were less by more deaths in
…1910. There …e summer than
…er months and … …3,900. Similar
…were more than
…ess than 66,000

High winter, and more especially spring, mortalities have
occurred in this State since epidemic influenza has annually
occurred, beginning in 1889. The daily average mortality for
twenty years has been highest in March, 395, and for the spring
months 376; next to that the winter months, with a daily average
of 364; summer has had 358 and autumn 324. The chief con-
tributor to the sickness and death rate of the State has been
influenza. As the recurring epidemics have reached their height
more often in March than in any other month, it has the highest
death rate of any month in the year. This has produced large
pneumonia and other acute respiratory disease mortalities; also
large death rates during its prevalence in diseases of the nervous
and circulatory systems. It has made little impression on the
mortality of early life, but greatly increased that of advanced age.

The control of this cause of death has not been reached, or at
least it has not been very amenable to control. Pneumonia is now,
however, being placed on the list of communicable diseases and
isolation of the sick advised, which will effect a lowering of the
death rate from this chief of winter diseases.

This year March had the highest mortality of the year, although
much lower than that of the two preceding years, but the pneu-
monia mortality was considerably reduced while the circulatory
system mortality exceeded it and was the chief source of the high
rate; it was above 2,000 monthly during the first four months,
which is most excessive, and amounted to 16 per cent. of the total;
pneumonia caused 9 per cent. of the deaths. Some control of the
latter may have been effected; the former admits of no means of
reaching by any method of isolation, not being communicable
save insofar as the influenza acting on a weakened organism may
be controllable.

The winter mortality is high also in diseases of the nervous
system. There were 1,000 more deaths in the winter and spring
than in the summer and fall. There were 10,500 deaths and
this is half the number, from diseases of the circulatory system.

Bright's disease which caused 10,613 deaths is also a disease of
…d weather mortality.

Tuberculosis of the lungs caused 13,700 deaths in the twelve
…nths, and of these 7,800 occurred in the winter-spring months.

Some of them are undoubtedly preci
enza. Tuberculosis has always bee
mortality of any single disease, and
that of the circulatory system excee
ease upon the control of which seric
trated in recent years, one is intere
efforts are bearing fruit in lessening
deaths this year are less than occurre
preceding and is a saving of 500 deat
years 10 per cent. of the deaths w
year, while there is a decrease in the
from this cause have had more of a c

By five-year periods, from 1885 wh
records of mortality, in the first quir
the deaths were from tuberculosis of t
per cent.; in the third, 10.6 per cen
cent.; in the fifth, 10.0 per cent. In t
out of a total mortality of 3,288,(
tuberculosis, which is 10.2 per cent.
three years the proportion of tubercu
10 per cent.

The deaths from tuberculosis hav
increase of general mortality. When
total deaths for the year were 100,0
were 12,000; now when they have r
culosis mortality is 14,000. Or, com
there were nearly as many deaths
tuberculosis when the State had six n
when the population rose to nine mi
208 tuberculosis deaths per 100,000 li
number of deaths is about the same v
mated at nine and one-half million, m
per 100,000.

The maritime district which is mos
always had the highest mortality f
Southern Tier district the lowest. F
1906, the deaths per 1,000 from all c
trict were from tuberculosis, 115; in

t. This year in the Maritime District 12 per cent. of the deaths are from tuberculosis and in the Southern Tier district 5 per cent. The urban tuberculosis mortality in 1909 was 175 per 100,000 population; in 1910 it was 164; in 1911 it was 161; in 1912 it is 152. The rural tuberculosis mortality in 1909 was 119 per 100,000 population; in 1910 it was 122; in 1911 it was 122; and in 1912 is 113. The large decrease amounting to 400 from last year in deaths from tuberculosis in the rural population is not apparent, but the uniform decrease in the urban is noteworthy, there being an actual saving of 200 over last year in the urban mortality.

Epidemic diseases, including 1,053 reported as from influenza (which for reasons already given comes far short of representing the actual mortality which should be credited to this disease) caused 5.2 per cent. of the deaths.

Influenza as the immediate cause of death has a decrease of almost one-half from last year or the year before, and the smaller total mortality of the year is mostly due to the lessened virulence of its annual recurrence which reached its height as it most frequently does in March.

Diphtheria is the largest contributor to the epidemic mortality. It is the disease more amenable to control. This year the number of deaths is the smallest of any year on record. Last year for the first time the deaths from it fell below 2,000; this year there are 250 less, about 1,600 in all. There were months in the year where for the first time the number of deaths was under 100. Twenty years ago there were 5,000 to 6,000 deaths yearly from diphtheria. For ten years the number has been below 3,000 and it is quite steadily decreasing. In 1892 there were 92 deaths per 100,000 population; this year there were less than 20; there were 6,000 deaths then, not 2,000 this year; there would have been 8,000 deaths this year if the rate of twenty years ago had continued. This is a saving accomplished by diphtheria antitoxin and public health work.

Typhoid fever caused 1,128 deaths, and this again is the smallest number in twenty-five years. Moreover the deaths of the last five years are fewer than previously. By five-year periods there were occurring in the earliest 1,319 deaths yearly; in the

Some of them are undoubtedly precipitated by an attack of influenza. Tuberculosis has always been the largest contributor to mortality of any single disease, and no group of diseases, except that of the circulatory system exceeds it. As a preventable disease upon the control of which serious efforts have been concentrated in recent years, one is interested to know how far these efforts are bearing fruit in lessening the mortality. The 13,700 deaths this year are less than occurred in either of the eight years preceding and is a saving of 500 deaths in the year. For the eight years 10 per cent. of the deaths were from consumption; this year, while there is a decrease in the deaths from all causes, those from this cause have had more of a decrease, viz. to 9.6 per cent.

By five-year periods, from 1885 which begins the Department's records of mortality, in the first quinquennium 11.8 per cent. of the deaths were from tuberculosis of the lungs; in the second, 10.3 per cent.; in the third, 10.6 per cent.; in the fourth, 10.2 per cent.; in the fifth, 10.0 per cent. In the twenty-five years 336,000 out of a total mortality of 3,288,000 were from pulmonary tuberculosis, which is 10.2 per cent. of the deaths. For the last three years the proportion of tuberculosis deaths has been below 10 per cent.

The deaths from tuberculosis have not increased with the increase of general mortality. When twenty-five years ago the total deaths for the year were 100,000, the tuberculosis deaths were 12,000; now when they have risen to 140,000, the tuberculosis mortality is 14,000. Or, comparing with the population, there were nearly as many deaths annually from pulmonary tuberculosis when the State had six million inhabitants as it had when the population rose to nine million. In 1892 there were 208 tuberculosis deaths per 100,000 living; twenty years later the number of deaths is about the same while the population is estimated at nine and one-half million, making the rate less than 145 per 100,000.

The maritime district which is mostly an urban population has always had the highest mortality from tuberculosis, and the Southern Tier district the lowest. For ten years, from 1897 to 1906, the deaths per 1,000 from all causes in the Maritime District were from tuberculosis, 115; in the Southern Tier district,

follows vaccination is due to it, and it is not probable that these were due to it.

Poliomyelitis is reported as the cause of nearly 200 deaths; they increased in July, were highest in August and high during the fall months. It was most prevalent in the western part of the State.

There were 227,120 births reported in the State during the year.

Very respectfully,

EUGENE H. PORTER, M.D.

State Commissioner of Health

January 15, 1913

APPENDIX

THIRTY-THIRD ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

FINANCIAL STATEMENT

Disbursements for the Fiscal Year ending September 30, 1912, from the several appropriations made for the Department

SALARIES

Division of Administration

Eugene H. Porter, M.D., Commissioner	$5,000 00
William A. Howe, M.D., Deputy Commissioner	3,500 00
Alec H. Seymour, secretary	3,500 00
Fenimore D. Beagle, chief clerk	2,700 00
Edward C. Kenny, stenographer	2,100 00
Marion L. Peters, stenographer	1,200 00
Helen L. MacQuide, telephone operator	600 00
Edward Jantz, page	440 00
Total	$19,040 00

Division of Engineering

Theodore Horton, chief engineer	$4,500 00
H. B. Cleveland, principal assistant engineer	2,700 00
C. A. Holmquist, assistant engineer	1,800 00
A. O. True, assistant engineer	1,800 00
A. Dudley Mills, stenographer	1,080 00
Effie DeShaw, typewriter copyist	510 00
Total	$12,390 00

Division of Vital Statistics

A. K. Cole, supply and record clerk	$1,800 00
William A. Wallace, clerk	1,500 00
Jeremiah Grogan, Jr., clerk	1,500 00
Ella H. Porter, clerk	1,200 00
Meta E. Mills, clerk	900 00

Anna B. Byrne, clerk	$900 00
Rae Samuels, clerk	900 00
Eleanore C. Gibb, clerk	900 00
Ruth Van Noy, stenographer	600 00
Joanna McNamara, typewriter copyist	500 00
K. C. Judd, laborer	720 00
Total	$11,420 00

Division of Communicable Diseases

Wm. B. May, director	$2,400 00
Cora B. Partridge, clerk	900 00
Ethel M. Snare, stenographer	877 50
Total	$4,177 50

Antitoxin Laboratory

William S. Magill, M.D., director	$3,500 00
I. H. Lindsay, clerk	1,500 00
Mary C. Cuthbert, stenographer	720 00
Mrs. J. Cruickshank, cleaner	720 00
Mrs. Fannie Mainster, cleaner	480 00
Margaret Hill, cleaner	480 00
Margaret Bott, cleaner	480 00
Ellen Slingerland, cleaner	360 00
Charles Schadler, stableman	720 00
Casimer De Meur, assistant stableman	540 00
William Cunningham, laborer	270 00
John H. Reynolds, laborer	180 00
Total	$9,950 00

Hygienic Laboratory

Leonard M. Wachter, chemist	$2,400 00
Wm. A. Bing, M.D., assistant bacteriologist	1,425 00
Leslie R. Milford, water analyst	1,475 00
Herbert Ant, water analyst	900 00

W. S. Davis, water analyst	$1,200 00
Mae E. Larkin, water analyst	706 00
Blanche C. Vose, cleaner	720 00
T. C. Conklin, laborer	720 00
John H. Reynolds, laborer	540 00
Bessie McComb, cleaner	270 00
Frank J. Brady, laborer	150 00
Total	$10,506 00

Division of Cold Storage

Frederick B. Rogers, salary as inspector	$739 47
Edward T. Scharff, salary as inspector	66 15
Wm. J. Roche, salary as inspector	66 15
Walter H. Spriggens, salary as inspector	66 15
Joseph H. Davis, salary as inspector	66 15
John W. Dilmore, salary as inspector	66 15
Jos. B. Hanf, inspector	1,138 76
Michael T. McNamara, inspector	1,138 76
John P. O'Keefe, inspector	1,138 76
Chas. S. Ferrin, inspector	1,138 76
Abraham L. Wilbert, inspector	1,138 76
Jos. B. Looby, inspector	1,138 76
Emerson E. Rossmore, inspector	1,138 76
Abraham Wilk, inspector	550 00
Thomas A. Brennan, special counsel	3,499 86
Alice M. Humphreys, stenographer	863 30
Florence Brennan, stenographer	300 00
Bertha M. Golden, clerk	380 00
Total	$14,634 70

Temporary Services

C. A. Howland, inspecting engineer	$553 00
Edith S. Burnham, stenographer	172 00
Augustus Ekert, junior clerk	150 00
Agnes Conrove, junior clerk	100 00
Jessie E. Durance, junior clerk	55 00

Marion G. Ingalls, junior clerk	$55 00
Ethel Delehanty, junior clerk	55 00
Celia J. Jarvis, junior clerk	55 00
Mary Carpenter, junior clerk	55 00
Flora M. Farrell, junior clerk	55 00
Gertrude M. Mack, junior clerk	45 00
Grace V. Clark, junior clerk	45 00
Bertha M. Golden, junior clerk	30 00
Mary C. O'Hare, junior clerk	30 00
Katherine M. Smith, junior clerk	15 00
Paul Bernhardt, laborer	186 00
Olive C. Ely, laborer	11 66
Martha Griggs, laborer	11 66
Mary Fitzsimmons, laborer	11 66
Gertrude Gillen, laborer	11 66
Edith Mesick, laborer	11 66
Kittie Fee, laborer	11 66
Total	$1,725 96

DETAILED STATEMENT OF DISBURSEMENTS

Antitoxin Laboratory

Addition to laboratory and repairs	$1,075 06
For equipment — antitoxin boxes, syringes and needles, platinum dishes, and general laboratory supplies	1,987 78
Hay, straw, oats and feed	1,128 59
Horses	425 00
Meats and vegetables	829 20
Office supplies	14 15
Desks and chairs	90 00
Books	8 20
Coal	195 00
Gas and electricity	90 90
Printing	278 87
Telephone service	87 37
Postage and transportation	580 93

Traveling expenses	$13 65
Laundry	12 00
	$6,816 70
Salaries — regular payroll	9,950 00
	$16,766 70

Hygienic Laboratory

Equipment — repairs to laboratory, incubator, test tubes, sputum jars and miscellaneous supplies	$1,030 96
Services of Bender Laboratory	2,000 00
Postage and transportation	209 20
Gas	361 40
Water rentals	79 08
Ice and spring water	67 11
Laundry	17 31
Printing	83 26
Books	7 50
Office supplies	17 00
Telephone service	30 75
Traveling expenses, collecting samples water, etc.	880 88
	$4,784 45
Salaries — regular pay roll	10,506 00
	$15,290 45

Division of Cold Storage Inspection

Office expenses — postage	$500 00
Office expenses — printing inspection report blanks, etc.	460 35
Office expenses — steel filing cases and index cabinet	335 00
Office expenses — typewriters	132 00
Office expenses — manila folders and office supplies	176 65

Office expenses — publishing notices of hearings..	$194 62
Office expenses — stenographic reports of hearings	24 00
Office expenses — subscriptions to trade journals.	5 00
	$1,727 62
Traveling expenses of inspectors, etc..........	8,038 37
Salaries — regular payroll	14,634 70
	$24,400 69

Division of Engineering

Equipment — instruments, etc.	$717 71
Book and filing cases........................	146 50
Desk	52 00
Charts and maps	43 95
Electric fan	14 00
Repairs to sewage disposal model.............	11 40
Books and subscriptions	164 91
Printing	21 27
Office supplies	14 95
	$1,186 69
Salaries — regular payroll	12,390 00
	$13,576 69

Investigations

Expenses in connection with Annual Conference of State Sanitary Officers		$1,013 72
Expenses in connection with public hearings, establishment of tuberculosis hospitals, etc.:		
*J. C. Marriott, stenographer......	$524 10	
Dr. Thos. S. Carrington, examination of plans for hospitals......	250 00	
Traveling expenses	201 37	
Publication of notices of hearings..	68 83	
		1,044 30

* Also paid $143.10 for reporting proceedings of Annual Conference of Sanitary Officers.

Charts and printed forms for examination of sight and hearing of school children		$538 00
Investigation of sanitary conditions of cities, summer resorts, State institutions, public water supplies and sewage disposal, nuisances, etc.:		
Services:		
Prof. H. N. Ogden, special assistant engineer	$975 00	
C. A. Howland, inspecting engineer.	409 50	
Harold H. Robinson, draftsman	32 00	
James E. Cuff, inspecting engineer.	60 00	
Weston Gavett, inspecting engineer.	42 00	
Clyde F. Smith, inspecting engineer	36 00	
C. S. Ell, inspecting engineer	21 00	
Traveling expenses	1,113 08	
		2,688 58
Expenses at Quarantine Station on account of cholera:		
Dr. J. E. Clark, bacteriologist, services	$830 00	
Equipment and expenses	930 25	
		1,760 25
Investigation of shellfish pollution:		
Services of A. V. Solomon, bacteriologist	$177 00	
Services of C. T. Wanzer, sanitary inspector	177 00	
Equipment	265 41	
Expenses	566 37	
		1,185 78
Registration of Vital Statistics:		
Services of Prof. Walter F. Willcox, consulting statistician	$30 00	
Expenses	69 06	
		96 06
		$8,329 69

Marriage Licenses

Printing blank affidavits, marriage lic
certificates of marriage; registers and in

Office Expenses

Printing — publication of Monthly Bulle
birth and death certificates, circulars
phlets, and office stationery..........
Telephone service ....
Telegraph and messenger service.... ....
Books and subscriptions ....
Index cards ....
Book and filing cases ....
Desks and chairs ....
Typewriter ....
Spring water ....
Envelopes for Monthly Bulletin, etc...
Miscellaneous office supplies ....

Prevention of Ophthalmia Ne

Services of employes engaged in putting up and shipping O. N. outfits:
Dorothy Knauf, stenographer .....
Walter Reynolds, laborer ....
Rose Scheuer, cleaner ....
Mary N. Everett, cleaner ....
Effie P. Hein, cleaner...........

Postage ....
Office supplies ....
Boxes and mailing cases ....
Equipment — glass vials, rubber tubing, c
and supplies ....
Printing — circulars and wrappers.......
Gas and light ....

Coal	$52 00
Laundry	19 38
Telephone service	8 65
Express	256 32
	$5,188 11

Postage and Transportation

Postage	$2,412 31
Express	2,379 02
Freight and trucking	141 14
Boxes for annual reports	28 00
	$4,960 47

Suppression of Communicable Diseases

Printing — pamphlets and circulars for suppression and control of communicable diseases, report cards, etc.		$1,843 88
Publication of notices		16 34
Books		68 00
Equipment — repairs to tuberculosis exhibits, lantern slides, etc.		861 76
Rental — rooms for Department's exhibits		325 00
Services of medical experts investigating epidemics, etc.:		
Dr. W. D. Alsever	$20 00	
Dr. A. W. Booth	15 00	
Dr. W. W. Belcher	170 00	
Dr. Eliot T. Bush	20 00	
Dr. Edward Clark	645 00	
Dr. Harlan P. Cole	90 00	
Dr. Hills Cole	110 00	
Dr. H. H. Crum	25 00	
Dr. F. C. Curtis	775 00	
Dr. H. K. DeGroat	10 00	
Dr. G. M. Fisher	30 00	
Dr. W. B. Gibson	50 00	

Dr. C. H. Glidden ....
Dr. O. J. Hallenbeck ....
Dr. John B. Huber ....
Dr. A. D. Lake ....
Dr. J. W. Le Seur ....
Dr. F. J. Mann ....
Dr. Geo. W. Miles ....
Dr. V. A. Moore ....
Prof. H. N. Ogden ....
Dr. Chas. S. Prest ....
Dr. Jos. Roby ....
Dr. H. L. K. Shaw..............
Dr. B. W. Sherwood ....
Dr. W. C. Thompson ....
Dr. D. M. Totman ....
Dr. H. L. Wheeler ....
Dr. W. A. White ....
Dr. A. G. Wilding ....
Prof. Walter F. Willcox..........
Dr. E. S. Willard ....
Dr. John S. Wilson ....
Chas. S. Edgerton, plotting maps ..

Traveling expenses and supplies .....

Traveling Expen

Monthly expenses of the Departme water supplies, sewage disposal, public vital statistics, epidemics of communica dition of cities and summer resorts, hol

October, 1911 ....
November, 1911 ....
December, 1911 ....
January, 1912 ....
February, 1912 ....
March, 1912 ....

April, 1912	$523 90
May, 1912	559 57
June, 1912	154 09
July, 1912	240 35
August, 1912	226 28
September, 1912	53 43
	$6,585 90

Tuberculosis Exhibition

Repairs to exhibits	$11 98

United States Exhibit

Equipment — models, screens, mottoes, charts, frames and labor and material	$4,595 59
Expenses collecting material for exhibit and with the exhibit while shown in Washington	1,785 27
Express and freight charges, cartage and storage	343 60
Printing — booklets, catalogue of exhibit, etc	517 27
Stationery and office expenses	164 78
Postage	100 00
C. J. Storey, services as director	955 00
J. H. O'Neill, services as assistant to director	400 00
Wm. C. Ackroyd, services as assistant to director	105 32
Wm. H. LaDue, sanitary engineer	250 07
Abram Mazean, services as draftsman	133 00
Herbert H. Southard, services as draftsman	21 77
Thos. Farrell, services as draftsman	15 00
C. S. Edgerton, services as draftsman	10 00
Mary C. Padula, services as stenographer	126 66
Clara E. Rausch, services as stenographer	75 03
Grace E. Richards, services as clerk	65 00
Dr. W. A. White, services in preparing exhibit on oral hygiene and with exhibit in Washington	270 00
Dr. W. W. Belcher, services	20 00
Earl W. Benjamin, services with exhibit	36 00
	$9,989 35

Above includes all payments made fr
for the purpose of preparing a State ex
health, sanitation and vital statistics, t
International Congress on Hygiene and
ington, D. C., in September, 1912, and i
to January 1, 1913. (Account closed.)

RECAPITULATION

Total Expenditures During the Year out
for the Departmen

Division of administration, salaries	
Division of cold storage inspection:	
Salaries	$1
Traveling expenses	[illegible]
Office expenses	[illegible]
Division of communicable diseases:	
Salaries	$4
Suppression epidemics, etc......	5
Services of experts, etc., and other expenses	5
Division of engineering:	
Salaries	$12,
Expenses	1,
Antitoxin laboratory:	
Salaries	$9,
Expenses	6,
Hygienic laboratory:	
Salaries	$10,
Expenses	4,
Division of vital statistics, salaries........	
Investigations:	
Salaries	$2,
Other expenses	5,

Marriage license blanks		$2,000 00
Office expenses		8,978 07
Postage and transportation		4,960 47
Prevention of ophthalmia neonatorum:		
Salaries	$2,250 00	
Supplies, etc.	2,938 11	
		5,188 11
Temporary employes — paid out of unexpended balances reappropriated		1,725 96
Traveling expenses:		
General	$6,585 90	
Commissioner	944 27	
Deputy commissioner	508 27	
		8,038 44
Tuberculosis exhibition — repairs		11 98
United States exhibit		9,989 35
		$165,156 25

DIVISION

OF

VITAL STATISTICS

TABLE 1

Total Registration in Stat

The following table shows the total re
and marriages occurring in the State s

YEAR	Population	*Births	Deaths
1885	5,609,910	63,536	80,407
1886	5,719,855	89,828	86,801
1887	5,831,947	102,038	108,269
1888	5,946,246	103,089	114,584
1889	6,062,764	114,804	113,155
1890	6,182,600	112,572	128,648
1891	6,316,333	125,909	129,850
1892	6,438,283	130,143	131,388
1893	6,537,716	136,297	129,659
1894	6,638,696	141,827	123,423
1895	6,741,246	142,311	128,834
1896	6,845,375	147,327	126,253
1897	6,951,111	144,631	118,525
1898	7,058,459	138,702	122,584
1899	7,167,491	136,778	121,831
1900	7,281,533	143,156	132,089
1901	7,434,896	140,539	131,335
1902	7,591,491	146,740	124,830
1903	7,751,375	158,343	127,498
1904	7,914,636	165,014	142,217
1905	8,081,333	172,259	137,435
1906	8,251,538	183,012	141,099
1907	8,425,333	196,020	147,130
1908	8,546,356	203,159	138,912
1909	8,699,643	202,656	140,261
1910	9,158,328	213,235	147,710
1911	9,372,954	221,678	145,912
1912	9,592,258	227,120	142,377

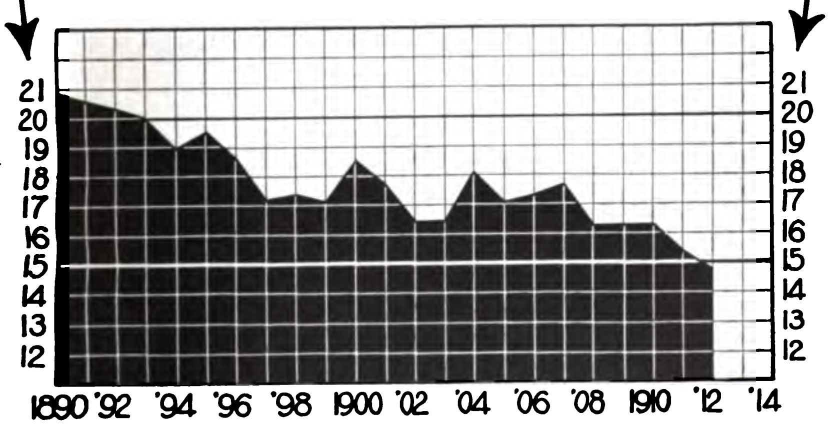
* Still births excluded.

The urban death rate was 14.7; the
population is more than three times th
of the State being within the incorpor
villages. The urban mortality is less th
of the State. Last year the urban deat
sand population, and the rural 15.8. I
is a growing one; 200,000 was added to
rural population is relatively stagnant.
population that lowers a death rate.

New York City has a death rate of
26.5, the average death rate of the pas
16.8 and the birth rate, 27.9. The cit
000 to its population. But at the same
this year, which is from 1,000 to 2,50
past five years; in 1909 there were over
has increased in population 50,000 and
than in 1909, with a death rate this year
average of 15.7. Rochester, with an in

DIAGRAM SHOWING
FLUCTUATIONS
OF THE DEATH RATE
PER THOUSAND

IN THE STATE
OF NEW YORK
SINCE 1890



Of these diphtheria causes 1,624
year. The average yearly mortali
seven years preceding has been 2,4
before that it was 4,600; in some
twenty-five years ago, its deaths
Never before were there so few de
year; last year for the first they fel

Typhoid fever causes 1,128 death
number on our records. For the las
has been 1,300, and for twenty-three
a yearly average of 1,600 deaths fr
ing has been entirely urban and an

Diarrheal diseases caused 8,461 d
year. It is not far from its average

Measles caused 1,050 deaths, whi
last year. It caused more deaths th
there were 789 deaths; the latter
prevalence which is likely, as in the
two years.

Whooping cought caused 683 dea
ranged from 500 to 1,300; last
from it.

Smallpox, with 4 deaths which oc
county, and in New York, has bee
this small fatality indicates, and at
ing in several localities in the Stat
vaccination, which is faithfully used
general.

Poliomyelitis is credited with 18
the western part of the State. The
3 from anthrax, 7 from glanders, 5
of which one was of native origin,

Influenza is given as the direct c
directly it caused very many more, t
hardly be estimated.

Pneumonia, much of the fatality
winter prevalence of influenza, ca
far from the average of the past fi
years has exceeded 15,000 deaths.

TABLE 3

URBAN AND RURAL RATES PER 10
DIFFERENT CAU

All causes
Typhoid fever
Malaria
Measles
Scarlet fever
Whooping cough
Diphtheria and croup
Influenza
Erysipelas
Cerebrospinal meningitis
Pulmonary tuberculosis
Other forms of tuberculosis
Cancer and other malignant tumors
Diabetes
Other general diseases
Diseases of nervous system
Diseases of circulatory system
Pneumonia
Other diseases of respiratory system
Diarrhea and enteritis
Under 2 years
Over 2 years
Other diseases of digestive system
Bright's disease and nephritis
Other diseases of genito-urinary system
The puerperal state
Congenital debility (under 3 months)
Accidents
Suicides
Homicides
Ill-defined diseases
All other causes

BIRTHS

The following shows the number
reported to this Department, classi
births occurred:

TABLE

MONTH	Total living births	White	Col
January	19,589	19,289	
February	18,570	18,318	
March	19,261	19,022	
April	18,483	18,232	
May	18,031	17,757	
June	18,417	18,153	
July	19,929	19,642	
August	19,775	19,474	
September	18,667	18,437	
October	18,947	18,690	
November	17,887	17,665	
December	19,564	19,321	
Total	227,120	224,000	3

The 3,120 colored births were
3,053; Indian, 34; Chinese, 21; J

CITY REGISTRA

The following table shows the reporte cities, grouped in order of population; and average rates for the past five yeaı population are also included in the ur of our villages have a larger populatioı cities.

TABLE 6

CITY	Population 1912 census estimate	Deaths	Bir
City of New York	5,114,090	73,019	135
Borough of Manhattan	2,435,102	36,559	66
Borough of Bronx	503,181	6,944	13
Borough of Brooklyn	1,760,848	23,994	45
Borough of Queens	323,089	3,978	8
Borough of Richmond	91,870	1,544	2
Buffalo	444,915	6,527	11
Rochester	234,514	3,371	
Syracuse	146,133	2,177	
Albany	101,469	2,046	
Yonkers	88,132	1,083	
Schenectady	79,444	1,017	
Utica	79,297	1,503	
Troy	77,058	1,520	
Binghamton	50,864	908	
Elmira	37,833	554	
Auburn	35,637	571	
Amsterdam	34,645	493	
Jamestown	33,693	399	
Mount Vernon	33,631	401	
New Rochelle	32,707	379	
Niagara Falls	32,263	544	
Poughkeepsie	29,199	489	
Newburgh	28,478	519	
Watertown	27,388	461	
Kingston	26,133	481	
Cohoes	25,000	440	
Oswego	23,814	383	
Rome	21,931	488	
Gloversville	21,576	306	
Lockport	18,215	291	
Dunkirk	18,137	227	
White Plains, village	17,892	256	
Ogdensburg	16,439	459	
Peekskill, village	16,170	191	
Lackawanna	16,011	410	
Glens Falls	15,510	235	
Olean	15,496	215	
Watervliet	15,341	269	
Middletown	15,147	374	
Ithaca	14,940	231	
Corning	13,861	235	
Hornell	13,830	203	
Port Chester, village	13,537	195	
Ossining, village	12,886	200	
Little Falls	12,831	191	
North Tonawanda	12,779	136	
Geneva	12,574	213	
Saratoga Springs, village	12,555	272	

TABLE 6 — (*Concluded*)

CITY	Population 1912 census estimate	Deaths	Births	Rate per 1,000 Population		Average Rate Past 5 Years	
				Deaths	Births	Deaths	Births
Batavia, village	12,246	224	309	18.3	25.2	16.7	17.9
Hudson	11,894	211	225	17.7	18.9	17.8	18.6
Cortland	11,643	205	238	17.6	20.4	15.5	17.9
Plattsburg	11,602	181	255	15.6	22.0	15.1	21.7
Fulton	11,230	202	291	18.0	25.9	14.9	21.2
Johnstown	10,755	123	161	11.4	15.0	14.5	17.0
Rensselaer	10,719	152	157	14.2	14.7	14.0	14.4
Oneonta	10,141	162	214	16.0	21.1	17.9	17.4
Port Jervis	9,564	154	155	16.1	16.2	17.7	17.5
Tonawanda	8,464	108	156	12.8	18.4	13.1	20.8
Oneida	8,317	122	154	14.7	18.5	14.7	17.7
Total urban	7,260,570	106,726	184,966	14.7	25.5	16.6	26.0
Total rural	2,331,688	35,651	42,154	15.3	18.0	15.8	16.8
Total for State	9,592,258	142,377	227,120	14.8	23.7	16.3	23.5

TABLE 7

TOTAL REGISTRATION OF EACH REGISTRATION DISTRICT IN THE STATE

Albany County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Albany, city	1,918	2,046	1,004	Knox, town	17	10	5
Altamont, village	9	15	.....	New Scotland, town	25	24	9
Berne, town	26	27	8	Rensselaerville, town	22	23	10
Bethlehem, town	59	69	32	Voorheesville, village	8	9	......
Coeymans, town	125	75	36	Watervliet, city	284	269	131
Cohoes, city	639	440	140	Westerlo, town	19	22	12
Colonie, town	114	112	70	†Delayed returns	51	1	2
Green Island, town*	....	.....	.....				
Green Island, village	69	76	41	Total	3,420	3,258	1,522
Guilderland, town	35	40	22				

* Town and village have same boundaries.
† "Delayed returns" are certificates of previous years received at the Department during the ear of this report.

Chautauqua County — (Co

	Births, 1912	Deaths, 1912	Marriages, 1912	
Pomfret, town	45	27	47	Stockton, t
Portland, town	39	28	26	Villenova, t
Ripley, town	44	29	77	Westfield, t
Sheridan, town	26	28	9	Westfield, v
Sherman, town	24	8	13	Delayed re
Sherman, village	9	18	.....	
Silver Creek, village	63	37	.....	Total.
Sinclairville, village	6	7	.....	

Chemung County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Ashland, town	5	7	6	Horsehea
Baldwin, town	3	6	4	Horsehea
Big Flats, town	29	29	9	Southpor
Catlin, town	18	19	2	Van Ette
Chemung, town	21	19	3	Van Ette
Elmira, town	15	31	6	Veteran,
Elmira, city	607	549	474	Wellsbur
Elmira Heights, village*	65	34	.....	Delayed
Erin, town	20	11	5	
				Tot

* Part of village in town of Horseheads.

Chenango Cou

	Births, 1912	Deaths, 1912	Marriages, 1912	
Afton, town	19	18	16	Norwic
Afton, village	11	18	.....	Otselic
Bainbridge, town	14	16	14	Oxford
Bainbridge, village	28	22	.....	Oxford
Columbus, town	10	5	2	Pharsa
Coventry, town	8	12	3	Pitche
German, town	12	3	1	Plymo
Greene, town	31	19	25	Presto
Greene, village	15	29	.....	Sherbu
Guilford, town	32	45	14	Sherbu
Lincklaen, town	16	10	6	Smith
McDonough, town	20	13	4	Smyrr
New Berlin, town	17	29	15	Smyrr
New Berlin, village	12	19	.....	Delay
North Norwich, town	8	12	3	
Norwich, town	16	14	68	T

Delaware County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Andes, town	25	23	12	Margaretville, vi
Andes, village	9	4	.....	Masonville, town
Bovina, town	19	11	3	Meredith, town
Colchester, town	63	53	25	Middletown, tow
Davenport, town	20	24	8	Roxbury, town
Delhi, town	25	27	23	Sidney, town
Delhi, village	18	33	.....	Sidney, village
Deposit, town	17	13	19	Stamford, town
Franklin, town	37	30	11	Stamford, village
Franklin, village	1	6	.....	Tompkins, town
Hamden, town	31	23	18	Walton, town
Hancock, town	59	34	32	Walton, village
Hancock, village	20	18	.....	Delayed returns
Harpersfield, town	19	9	12	
Hobart, village	12	10	.....	Total
Kortright, town	34	31	14	

Dutchess County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Amenia, town	38	29	20	Pleasant Valley, tc
Beekman, town	15	14	8	Pleasant Valley, vi
Clinton, town	11	25	13	Poughkeepsie, tow
Dover, town	35	21	15	Poughkeepsie, city
East Fishkill, town	46	44	6	Red Hook, town
Fishkill, town	52	35	109	Red Hook, village
Fishkill, village	5	10	.....	Rhinebeck, town
Fishkill Landing, village	94	59	.....	Rhinebeck, village
Hyde Park, town	53	39	16	Stanford, town
La Grange, town	34	22	3	Tivoli, village
Matteawan, village	142	120	.....	Union Vale, town
Milan, town	7	19	6	Wappinger, town
Millbrook, village	35	15	.....	Wappingers Falls, lage
Millerton, village	11	7	.....	
North East, town	22	15	31	Washington, town
Pawling, town	22	21	15	Delayed returns
Pawling, village	15	10	.....	
Pine Plains, town	20	20	4	Total

Erie County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Akron, village	33	30	.....	Collins, town
Alden, town	31	20	21	Concord, town
Alden, village	13	7	.....	Depew, village
Amherst, town	72	43	40	East Aurora, village
Angola, village	31	26	.....	East Hamburg, town
Aurora, town	44	20	31	Eden, town
Blasdell, village	30	9	.....	Elma, town
Boston, town	29	18	8	Evans, town
Brant, town	52	28	13	Farnham, village
Buffalo, city	11,591	6,527	4,286	Grand Island, town
Cheektowaga, town	94	100	63	Hamburg, town
Clarence, town	61	38	25	Hamburg, village
Colden, town	22	16	6	Holland, town

Clinton County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Altona, town	45	25	23	Mooers, town	78	41	17
Ausable, town	18	12	17	Mooers, village	8	7	......
Beekmantown, town	18	28	13	Peru, town	48	18	15
Black Brook, town	36	29	7	Plattsburgh, town	35	32	15
Champlain, town	31	12	53	Plattsburgh, city	255	178	144
Champlain, village	34	21	.....	Rouses Point, village	29	11	......
Chazy, town	79	39	15	Saranac, town	74	38	17
Clinton, town	48	19	13	Schuyler Falls, town	36	16	14
Dannemora, town	68	24	13	Delayed returns	1	2	......
Dannemora, village	18	12	.....				
Ellenburg, town	65	25	25	Total	1,024	589	401

Columbia County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Ancram, town	16	17	6	Hudson, city	225	210	100
Austerlitz, town	8	13	7	Kinderhook, town	12	19	31
Canaan, town	26	14	8	Kinderhook, village	16	12	......
Chatham, town	20	33	60	Livingston, town	27	22	11
Chatham, village	34	39	.....	New Lebanon, town	20	22	10
Claverack, town	25	35	21	Philmont, village	35	27	......
Clermont, town	9	6	2	Stockport, town	28	28	18
Copake, town	28	21	8	Stuyvesant, town	50	26	14
Gallatin, town	6	11	8	Taghkanic, town	12	10	11
Germantown, town	27	27	11	Valatie, village	26	27	......
Ghent, town	20	38	28	Delayed returns	....	.....	......
Greenport, town	31	14	7				
Hillsdale, town	11	20	12	Total	712	691	373

Cortland County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Cincinnatus, town	21	23	11	Marathon, village	14	19	......
Cortland, city	238	205	104	Preble, town	10	14	1
Cortlandville, town	36	38	25	Scott, town	12	11	......
Cuyler, town	24	11	6	Solon, town	14	9	2
Freetown, town	6	5	0	Taylor, town	21	10	3
Harford, town	12	21	7	Truxton, town	18	15	7
Homer, town	18	12	24	Virgil, town	6	17	10
Homer, village	35	44	.....	Willet, town	13	17	8
Lapeer, town	5	10	7	Delayed returns	....	.....	3
McGrawville, village	13	17	.....				
Marathon, town	9	8	14	Total	525	506	232

Fulton County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Bleecker, town	16	6	5	Northampton, town
Broadalbin, town	30	33	14	Northville, village
Caroga, town	6	12	0	Oppenheim, town
Ephratah, town	28	26	13	Perth, town
Gloversville, city	383	307	174	Stratford, town
Johnstown, town	41	51	14	Delayed returns
Johnstown, city	161	133	109	
Mayfield, town	39	16	16	Total
Mayfield, village	7	4	.....	

Genesee County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Alabama, town	41	21	12	Elba, village
Alexander, town	21	9	7	Le Roy, town
Alexander, village	2	2	.....	Le Roy, village
Batavia, town	21	18	148	Oakfield, town
Batavia, village	309	223	.....	Oakfield, village
Bergen, town	17	10	7	Pavilion, town
Bergen, village	9	9	.....	Pembroke, town
Bethany, town	22	20	5	Stafford, town
Byron, town	28	19	7	Delayed returns
Corfu, village	5	4	.....	
Darien, town	36	24	7	Total
Elba, town	14	9	9	

Greene County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Ashland, town	5	8	6	Hunter, town
Athens, town	16	9	18	Hunter, village
Athens, village	31	34	.....	Jewett, town
Cairo, town	29	60	15	Lexington, town
Catskill, town	70	62	80	New Baltimore, town
Catskill, village	87	81	.....	Prattsville, town
Coxsackie, town	27	19	17	Tannersville, village
Coxsackie, village	46	40	.....	Windham, town
Durham, town	18	15	11	Delayed returns
Greenville, town	25	29	7	
Halcott, town	4	1	3	Total

Hamilton County

	Births 1912	Deaths 1912	Marriages, 1912	
Arietta, town	1	3	3	Long Lake, town
Benson, town	1	3	.....	Morehouse, town
Hope, town	3	2	4	Wells, town
Indian Lake, town	22	16	.....	Delayed returns
Inlet, town	2	2	.....	
Lake Pleasant, town	3	4	6	Total

Erie County — Continued

	Births, 1912	Deaths, 1912	Marriages, 1912
Kenmore, village	19	9	.....
Lackawanna, city	556	410	141
Lancaster, town	39	23	102
Lancaster, village	94	40	.....
Marilla, town	22	20	7
Newstead, town	46	23	23
North Collins, town	61	22	14
Sardinia, town	39	22	11
Sloan, village	19	11	.....
Springville, village	47	32	.....
Tonawanda, town	10	13	11
Tonawanda, city	156	107	68
Wales, town	23	14	2
West Seneca, town	101	77	36
Williamsville, village	20	13	.....
Delayed returns	7	1	99
Total	14,003	8,112	5,163

Essex County

	Births, 1912	Deaths, 1912	Marriages, 1912
Bloomingdale, village	7	7	.....
Chesterfield, town	18	24	11
Crown Point, town	31	37	15
Elizabethtown, town	16	11	10
Elizabethtown, village	2	7	.....
Essex, town	18	18	7
Jay, town	56	29	15
Keene, town	18	14	7
Keeseville, village	40	34	.....
Lake Placid, village	53	17	.....
Lewis, town	16	8	6
Minerva, town	13	11	6
Moriah, town	110	54	56
Newcomb, town	7	5	3
North Elba, town	27	16	23
North Hudson, town	9	9	2
Port Henry, village	54	31	.....
St. Armand, town	2	8	5
Schroon, town	13	10	6
Ticonderoga, town	55	40	43
Ticonderoga, village	38	30	.....
Westport, town	19	12	9
Westport, village	11	6	.....
Willsboro, town	18	18	11
Wilmington, town	13	10	5
Delayed returns	2	.....	1
Total	666	466	241

Franklin County

	Births, 1912	Deaths, 1912	Marriages, 1912
Altamont, town	37	25	37
Bangor, town	46	32	8
Belmont, town	81	25	9
Bombay, town	23	31	13
Brandon, town	12	10	5
Brighton, town	22	15	11
Burke, town	38	25	11
Chateaugay, town	49	29	21
Chateaugay, village	19	12	.....
Constable, town	30	19	15
Dickinson, town	39	29	11
Duane, town	11	3	.....
Fort Covington, town	30	15	20
Fort Covington, village	13	10	.....
Franklin, town	19	21	10
Harrietstown, town	21	21	69
Malone, town	75	53	111
Malone, village	122	127	.....
Moira, town	43	31	18
Santa Clara, town	16	10	1
Saranac Lake, village†	91	170	.....
Tupper Lake, village	70	37	.....
Waverly, town	58	17	24
Westville, town	32	23	2
Delayed returns	22	.....	1
Total	1,019	790	397

† Part of village in Essex county.

Fulton County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Bleecker, town	16	6	5	Northampton, town	19	19	21
Broadalbin, town	30	33	14	Northville, village	12	19	.....
Caroga, town	6	12	0	Oppenheim, town	20	15	10
Ephratah, town	28	26	13	Perth, town	7	4	5
Gloversville, city	383	307	174	Stratford, town	17	14	2
Johnstown, town	41	51	14	Delayed returns	2	1	2
Johnstown, city	161	133	109				
Mayfield, town	39	16	16	Total	788	660	385
Mayfield, village	7	4	.....				

Genesee County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Alabama, town	41	21	12	Elba, village	7	6	.....
Alexander, town	21	9	7	Le Roy, town	33	21	54
Alexander, village	2	2	.....	Le Roy, village	88	55	.....
Batavia, town	21	18	148	Oakfield, town	25	7	7
Batavia, village	309	223	.....	Oakfield, village	39	17	.....
Bergen, town	17	10	7	Pavilion, town	30	16	15
Bergen, village	9	9	.....	Pembroke, town	31	24	.....
Bethany, town	22	20	5	Stafford, town	17	22	7
Byron, town	28	19	7	Delayed returns	13	.....	.....
Corfu, village	5	4	.....				
Darien, town	36	24	7	Total	808	536	285
Elba, town	14	9	9				

Greene County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Ashland, town	5	8	6	Hunter, town	41	23	22
Athens, town	16	9	18	Hunter, village	3	4	.....
Athens, village	31	34	.....	Jewett, town	8	7	11
Cairo, town	29	60	15	Lexington, town	14	16	6
Catskill, town	70	62	80	New Baltimore, town	28	30	4
Catskill, village	87	81	.....	Prattsville, town	19	13	5
Coxsackie, town	27	19	17	Tannersville, village	14	6	.....
Coxsackie, village	46	40	.....	Windham, town	24	26	5
Durham, town	18	15	11	Delayed returns	....	.....	.....
Greenville, town	25	29	7				
Halcott, town	4	1	3	Total	509	483	210

Hamilton County

	Births 1912	Deaths 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Arietta, town	1	3	3	Long Lake, town	17	9	8
Benson, town	1	3	.....	Morehouse, town	1	1	.....
Hope, town	3	2	4	Wells, town	7	9	3
Indian Lake, town	22	16	.....	Delayed returns	....	.....	.....
Inlet, town	2	2	.....				
Lake Pleasant, town	3	4	6	Total	57	49	24

New York (Greater)

	Births, 1912	Deaths, 1912	Marriages, 1912
City of New York:			
Borough of Manhattan	66,249	36,559	38,990
Borough of the Bronx	13,600	6,944	*....
Borough of Brooklyn	45,454	23,994	16,341
Borough of Queens			
Borough of Richmond			
Total	1[illegible]		

* Included in Borough of Manhattan.

Niagara County

	Births, 1912	Deaths, 1912	Marriages, 1912
Barker, village	6	2	.....
Cambria, town	25	23	14
Hartland, town	34	31	9
La Salle, village	45	16	.....
Lewiston, town	41	30	23
Lewiston, village	6	5	.....
Lockport, town	31	43	23
Lockport, city	317	289	160
Middleport, village	20	31	.....
Newfane, town	69	54	37
Niagara, town	5	1	2
Niagara Falls, city	1,129	545	506
North Tonawanda, city			
Pendleton, town			
Porter, town			
Royalton, town			
Somerset, town			
Wheatfield, town			
Wilson, town			
Wilson, village			
Youngstown, village			
Delayed returns			
Total			

Oneida County

	Births, 1912	Deaths, 1912	Marriages, 1912
Annsville, town	25	22	9
Augusta, town	15	17	27
Ava, town	15	6	4
Boonville, town	29	19	23
Boonville, village	22	38	.....
Bridgewater, town	11	12	1
Bridgewater, village	1	2	.....
Camden, town	14	16	29
Camden, village	39	46	.....
Clayville, village	20	5	.....
Clinton, village	16	27	.....
Deerfield, town	19	22	10
Florence, town	10	11	2
Floyd, town	11	7	1
Forestport, town	7	6	4
Forestport, village	7	9	.....
Holland Patent, village	2	5	.....
Kirkland, town	80	56	43
Lee, town	23	25	15
Marcy, town	17	14	12
Marshall, town	29	26	11
New Hartford, town	111	61	50
New Hartford, village	23	21	.....
Oneida Castle, village	4	3	.....
Oriskany Falls, village	9	6	.....
Paris, town			
Prospect, village			
Remsen, town			
Remsen, village			
Rome, city			
Sangerfield, town			
Steuben, town			
*Sylvan Beach, village			
Trenton, town			
Trenton, village			
Utica, city			
Vernon, town			
Vernon, village			
Verona, town			
Vienna, town			
Waterville, village			
Western, town			
Westmoreland, town			
Whitesboro, village			
Whitestown, town			
Yorkville, village			
Delayed returns			
Total			

* April 1st corporation dissolved; under jurisdiction of town of Vienna.

Monroe County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Brighton, town	83	136	25	Parma, town	37	28	18
Brockport, village	62	53	.....	Penfield, town	50	27	9
Charlotte, village	38	30	.....	Perinton, town	37	24	56
Chili, town	32	18	13	Pittsford, town	17	22	24
Churchville, village	8	8	.....	Pittsford, village	30	18	.....
Clarkson, town	37	21	9	Riga, town	22	8	10
East Rochester, village	82	38	.....	Rochester, city	5,523	3,213	2,659
Fairport, village	60	52	.....	Rush, town	13	21	12
Gates, town	119	46	35	Spencerport, village	10	7	.....
Greece, town	120	132	51	Sweden, town	20	20	37
Hamlin, town	55	27	12	Webster, town	55	37	27
Henrietta, town	28	23	9	Webster, village	20	17	.....
Hilton, village	7	7	.....	Wheatland, town	54	35	15
Honeoye Falls, village	18	9	.....	Delayed returns	23	218	1
Irondequoit, town	97	45	24				
Mendon, town	15	17	20	Total	6,814	4,369	3,083
Ogden, town	42	12	17				

Montgomery County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Amsterdam, town	34	20	7	Minden, town	24	21	43
Amsterdam, city	775	493	423	Mohawk, town	20	17	11
Canajoharie, town	20	20	19	Nelliston, village	9	10	.....
Canajoharie, village	28	39	.....	Palatine, town	21	32	11
Charlestown, town	19	12	4	Palatine Bridge, village	12	5	.....
Florida, town	28	23	4	Root, town	14	24	3
Fonda, village	21	25	.....	St. Johnsville, town	6	13	45
Fort Johnson, village	9	9	.....	St. Johnsville, village	82	45	.....
Fort Plain, village	47	48	.....	Delayed returns	4	.....	.....
Fultonville, village	7	13	.....				
Glen, town	12	13	8	Total	1,209	890	577
Hagaman, village	17	8	.....				

Nassau County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Cedarhurst, village	54	19	.....	North Hempstead,			
East Rockaway, village	26	7	.....	town	484	202	146
Farmingdale, village	26	15	.....	Oyster Bay, town	433	263	170
Floral Park, village	23	15	.....	Plandome, village	2	0	.....
Freeport, village	120	73	.....	Rockville Center, vil-			
Hempstead, town	568	282	351	lage	65	47	.....
Hempstead, village	123	62	.....	Sea Cliff, village	21	29	.....
Lawrence, village	18	4	.....	Delayed returns	21	.....	1
Lynbrook, village	56	40	.....				
Mineola, village	115	134	.....	Total	2,155	1,193	668

Orleans County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Albion, town	24	29	53	Medina, village
Albion, village	91	94	.....	Murray, town
Barre, town	33	20	12	Ridgeway, town
Carlton, town	39	31	9	Shelby, town
Clarendon, town	23	9	14	Yates, town
Gaines, town	35	39	11	Delayed returns
Holley, village	41	31	.....	
Kendall, town	45	21	4	Total
Lyndonville, village	14	11	.....	

Oswego County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Albion, town	23	18	14	Oswego, city
Altmar, village	11	5	.....	Palermo, town
Amboy, town	11	8	6	Parish, town
Boylston, town	11	4	4	Parish, village
Central Square, village	5	10	.....	Phoenix, village
Cleveland, village	6	5	.....	Pulaski, village
Constantia, town	27	26	13	Redfield, town
Fulton, city	291	202	124	Richland, town
Granby, town	35	35	9	Sandy Creek, town
Hannibal, town	19	21	14	Sandy Creek, village
Hannibal, village	2	8	.....	Schroeppel, town
Hastings, town	31	33	15	Scriba, town
Lacona, village	7	6	.....	Volney, town
Mexico, town	35	46	20	West Monroe, town
Mexico, village	22	34	.....	Williamstown, town
New Haven, town	23	35	13	Delayed returns
Orwell, town	20	15	6	
Oswego, town	49	50	17	Total

Otsego County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Burlington, town	3	11	3	Oneonta, city
Butternuts, town	13	11	7	Otego, town
Cherry Valley, town	16	19	3	Otego, village
Cherry Valley, village	13	9	.....	Otsego, town
Cooperstown, village	47	45	.....	Pittsfield, town
Decatur, town	8	8	5	Plainfield, town
Edmeston, town	37	22	9	Richfield, town
Exeter, town	11	12	4	Richfield Springs, vil
Gilbertsville, village	6	11	.....	lage
Hartwick, town	24	34	11	Roseboom, town
Laurens, town	17	10	9	Schenevus, village
Laurens, village	1	4	.....	Springfield, town
Maryland, town	17	27	7	Unadilla, town
Middlefield, town	32	61	15	Unadilla, village
Milford, town	23	23	14	Westford, town
Milford, village	8	8	.....	Worcester, town
Morris, town	19	19	2	Delayed returns
Morris, village	5	12	.....	
New Lisbon, town	17	14	7	Total
Oneonta, town	15	19	4	

Onondaga County

	Births, 1912	Deaths, 1912	Marriages, 1912
Baldwinsville, village	51	51	.....
Camillus, town	45	24	15
Camillus, village	21	11	.....
Cicero, town	41	37	15
Clay, town	39	34	4
De Witt, town	43	70	78
East Syracuse, village	84	40	.....
Eastwood, village	11	8	.....
Elbridge, town	16	29	22
Elbridge, village	9	6	.....
Fabius, town	32	22	8
Fabius, village	4	7	.....
Fayetteville, village	20	30	.....
Geddes, town	9	14	54
Jordan, village	12	24	.....
La Fayette, town	17	24	8
Liverpool, village	38	22	.....
Lysander, town	45	35	28
Manlius, town	76	53	41
Manlius, village	29	18	.....
Marcellus, town	27	23	21
Marcellus, village	13	6	.....
Onondaga, town	71	202	41
Otisco, town	16	19	9
Pompey, town	32	31	12
Salina, town	38	18	37
Skaneateles, town	48	30	30
Skaneateles, village	15	23	.....
Solvay, village	154	74	.....
Spafford, town	30	19	8
Syracuse, city	3,063	2,177	1,379
Tully, town	27	8	10
Tully, village	11	14	.....
Van Buren, town	35	31	16
Delayed returns	16	1	25
Total	4,238	3,235	1,861

Ontario County

	Births, 1912	Deaths, 1912	Marriages, 1912
Bristol, town	16	11	9
Canadice, town	9	4	6
Canandaigua, town	21	20	100
Canandaigua, village	170	178	.....
Clifton Springs, village	23	40	.....
East Bloomfield, town	26	27	14
Farmington, town	25	20	9
Geneva, town	19	13	10
Geneva, city	246	214	128
Gorham, town	21	21	12
Hopewell, town	22	29	11
Manchester, town	30	27	42
Manchester, village	20	12	.....
Naples, town	18	17	17
Naples, village	11	22	.....
Phelps, town	61	37	22
Phelps, village	16	20	.....
Richmond, town	32	13	6
Seneca, town	56	28	11
Shortsville, village	24	14	.....
South Bristol, town	15	12	8
Victor, town	23	12	21
Victor, village	13	11	.....
West Bloomfield, town	22	11	7
Delayed returns	28	.....	50
Total	967	813	483

Orange County

	Births, 1912	Deaths, 1912	Marriages, 1912
Blooming Grove, town	20	17	20
Chester, town	26	17	18
Chester, village	12	14	.....
Cornwall, town	45	27	52
Cornwall, village	51	37	.....
Crawford, town	21	29	9
Deerpark, town	15	30	11
Goshen, town	31	58	36
Goshen, village	40	52	.....
Greenville, town	13	11	4
Hamptonburgh, town	27	10	5
Highland Falls, village	81	43	.....
Highlands, town	29	20	47
Middletown, city	309	261	170
Minisink, town	14	22	18
Monroe, town	20	13	28
Monroe, village	21	18	.....
Montgomery, town	40	21	57
Montgomery, village	11	16	.....
Mount Hope, town	30	36	8
Newburgh, town	107	66	14
Newburgh, city	555	519	249
New Windsor, town	59	38	20
Port Jervis, city	155	154	77
Tuxedo, town	60	40	23
Unionville, village	1	9	.....
Walden, village	76	54	.....
Wallkill, town	39	33	16
Warwick, town	95	70	62
Warwick, village	45	34	.....
Washington, village	18	12	.....
Wawayanda, town	40	40	13
Woodbury, town	49	30	21
Delayed returns	37	.....	1
Total	2,192	1,851	979

St. Lawrence County — Continue

	Births, 1912	Deaths, 1912	Marriages, 1912	
Hammond, town	22	23	11	Oswegatchie, town
Hammond, village	3	2	.....	Parishville, town
Hermon, town	22	16	10	Piercefield, town
Hermon, village	6	10	.....	Pierrepont, town
Hopkinton, town	30	16	11	Pitcairn, town
Lawrence, town	40	23	14	Potsdam, town
Lisbon, town	43	34	17	Potsdam, village
Louisville, town	25	15	8	Richville, village
Macomb, town	25	17	3	Rossie, town
Madrid, town	22	15	13	Russell, town
Massena, town	38	21	21	Stockholm, town
Massena, village	80	36	.....	Waddington, town
Morristown, town	29	19	23	Waddington, village
Morristown, village	9	6	.....	Delayed returns
Norfolk, town	81	26	19	
Norwood, village	46	29	.....	Total
Ogdensburg, city	361	263	110	

Saratoga County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Ballston, town	20	21	12	Providence, town
Ballston Spa, village	82	53	.....	Saratoga, town
Charlton, town	22	10	3	Saratoga Springs, town
Clifton Park, town	23	31	10	Saratoga Springs, village
Corinth, town	27	17	27	
Corinth, village	46	22	.....	Schuylerville, village
Day, town	9	10	4	South Glens Falls, village
Edinburg, town	11	14	3	
Galway, town	24	15	9	Stillwater, town
Galway, village	1	4	.....	Stillwater, village
Greenfield, town	25	18	13	Victory Mills, village
Hadley, town	15	10	6	Waterford, town
Halfmoon, town	13	25	54	Waterford, village
Malta, town	16	20	10	Wilton, town
Mechanicville, village	225	99	.....	Delayed returns
Milton, town	15	48	44	
Moreau, town	24	20	29	Total
Northumberland, town	20	12	9	

Schenectady County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Duanesburgh, town	40	29	13	Schenectady, city
Glenville, town	29	46	32	Scotia, village
Niskayuna, town	37	21	15	Delayed returns
Princetown, town	7	7	6	
Rotterdam, town	94	62	33	Total

Schoharie County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Blenheim, town	13	12	.....	Richmondville, town	8	17	10
Broome, town	10	12	4	Richmondville, village	4	18	.....
Carlisle, town	18	21	6	Schoharie, town	26	25	23
Cobleskill, town	12	13	31	Schoharie, village	10	14	.....
Cobleskill, village	23	27	.....	Seward, town	19	21	13
Conesville, town	11	4	8	Sharon, town	12	20	13
Esperance, town	13	8	6	Sharon Springs, village	10	11	.....
Esperance, village	3	7	.....	Summit, town	19	15	3
Fulton, town	35	20	11	Wright, town	15	12	9
Gilboa, town	27	27	7	Delayed returns	4	1	.....
Jefferson, town	25	21	6				
Middleburgh, town	27	27	24	Total	350	365	174
Middleburgh, village	6	12	.....				

Schuyler County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Burdett, village	8	11	.....	Orange, town	13	14	7
Catharine, town	23	19	15	Reading, town	18	15	9
Cayuta, town	8	6	.....	Tyrone, town	20	26	13
Dix, town	27	30	53	Watkins, village	36	59	.....
Hector, town	55	44	25	Delayed returns	....	.....	.....
Montour, town	4	10	20				
Montour Falls, village	16	26	.....	Total	234	266	142
Odessa, village	6	6	.....				

Seneca County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Covert, town	17	21	16	Seneca Falls, village	149	102	.....
Fayette, town	36	36	15	Tyre, town	25	16	2
Interlaken, village	10	8	.....	Varick, town	11	19	9
Junius, town	13	15	8	Waterloo, town	12	20	38
Lodi, town	28	16	11	Waterloo, village	61	76	.....
Ovid, town	19	14	9	Delayed returns	1	1	.....
Ovid, village	7	6	.....				
Romulus, town	25	18	14	Total	430	377	177
Seneca Falls, town	16	9	55				

Steuben County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Addison, town	8	7	25	Campbell, town	25	21	10
Addison, village	28	35	.....	Canisteo, town	19	19	51
Avoca, town	25	16	35	Canisteo, village	34	53	.....
Avoca, village	15	13	.....	Caton, town	16	16	6
Bath, town	44	43	46	Cohocton, town	31	34	23
Bath, village	36	73	.....	Cohocton, village	12	9	.....
Bradford, town	10	6	6	Corning, town	30	78	1
Cameron, town	10	23	7	Corning, city	260	235	15

Steuben County — Continued

	Births, 1912	Deaths, 1912	Marriages, 1912	
Dansville, town.......	26	11	9	Rathbone, town...
Erwin, town..........	17	18	30	Savona, village.....
Fremont, town........	17	14	4	Thurston, town....
Greenwood, town......	19	9	7	Troupsburg, town
Hammondsport, village	23	18	.....	Tuscarora, town...
Hartsville, town......	4	6	2	Urbana, town......
Hornby, town........	14	17	3	Wayland, town.....
Hornell, city..........	230	203	155	Wayland, village...
Hornellsville, town....	21	26	7	Wayne, town......
Howard, town........	15	20	6	West Union, town..
Jasper, town..........	24	9	10	Wheeler, town.....
Lindley, town........	11	12	19	Woodhull, town....
Painted Post, village...	24	21	.....	Woodhull, village...
Prattsburg, town......	17	16	21	Delayed returns....
Prattsburg, village....	8	24	.....	
Pulteney, town.......	16	20	16	Total.........

Suffolk County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Amityville, village....	34	84	.....	Riverhead, town....
Babylon, town........	74	67	67	Sag Harbor, village.
Babylon, village......	62	69	.....	Shelter Island, town
Bellport, village.......	5	5	.....	Smithtown, town...
Brookhaven, town.....	233	223	130	Southampton, town.
East Hampton, town..	99	53	22	Southampton, villag
Greenport, village.....	92	49	.....	Southold, town.....
Huntington, town.....	242	138	75	Delayed returns....
Islip, town...........	331	190	110	
Northport, village.....	32	23	.....	Total.........
Patchogue, village.....	45	41	.....	

Sullivan County

	Births, 1912	Deaths, 1912	Marriages, 1912	
Bethel, town......	21	32	15	Lumberland, town..
Callicoon, town......	29	31	8	Mamakating, town
Cochecton, town......	16	19	4	Monticello, village..
Centerville Station, village..............	15	4	.....	Neversink, town.... Rockland, town....
Delaware, town.......	31	20	16	Thompson, town ..
Fallsburgh, town......	74	54	20	Tusten, town .....
Forestburgh, town....	9	6	2	Wurtsboro, village..
Fremont, town........	34	12	7	Delayed returns....
Highland, town.......	14	13	8	
Liberty, town.........	54	80	50	Total........
Liberty, village......	25	87	.....	

Tioga County

	Births, 1912	Deaths, 1912	Marriages, 1912
Barton, town	18	23	100
Berkshire, town	11	14	8
Candor, town	43	29	14
Candor, village	6	14	.....
Newark Valley, town	27	23	15
Newark Valley, village	14	18	.....
Nichols, town	9	16	12
Nichols, village	7	10	.....
Owego, town	69	72	85
Owego, village	54	89	......
Richford, town	17	14	7
Spencer, town	18	11	7
Spencer, village	15	14	......
Tioga, town	27	36	10
Waverly, village	59	63	......
Delayed returns	4	.....	......
Total	398	446	258

Tompkins County

	Births, 1912	Deaths, 1912	Marriages, 1912
Caroline, town	30	27	13
Danby, town	26	18	5
Dryden, town	44	38	21
Dryden, village	10	16	.....
Enfield, town	13	12	5
Freeville, village	3	14	.....
Groton, town	28	37	18
Groton, village	21	8	.....
Ithaca, town	34	23	11
Ithaca, city	252	231	156
Lansing, town	31	39	22
Newfield, town	16	20	9
Newfield, village	3	7	......
Trumansburg, village	21	24	......
Ulysses, town	22	41	19
Delayed returns	7	1	......
Total	561	556	279

Ulster County

	Births, 1912	Deaths, 1912	Marriages, 1912
Denning, town	7	1	6
Ellenville, village	36	60	.....
Esopus, town	59	54	25
Gardiner, town	34	24	2
Hardenburgh, town	4	6	3
Hurley, town	28	38	8
Kingston, town	9	11	2
Kingston, city	445	481	210
Lloyd, town	49	43	20
Marbletown, town	58	43	12
Marlborough, town	80	30	16
Marlborough, village	12	11	.....
New Paltz, town	42	43	15
New Paltz, village	21	19	.....
Olive, town	88	48	15
Pine Hill, village	5	7	.....
Plattekill, town	28	27	6
Rifton, village	12	4	......
Rochester, town	44	45	15
Rosendale, town	27	28	22
Rosendale, village	14	13	......
Saugerties, town	121	110	59
Saugerties, village	70	54	......
Shandaken, town	42	30	20
Shawangunk, town	33	28	14
Ulster, town	39	44	20
Wawarsing, town	86	52	59
Woodstock, town	26	27	6
elayed returns	35	1	1
Total	1,554	1,382	556

Warren County

	Births, 1912	Deaths, 1912	Marriages, 1912
Bolton, town	22	25	10
Caldwell, town	15	10	22
Chester, town	23	25	15
Glens Falls, city	305	235	127
Hague, town	10	12	10
Horicon, town	21	16	12
Johnsburg, town	33	31	24
Lake George, village	12	12	.....
Luzerne, town			
Queensbury, town			
Stony Creek, town			
Thurman, town			
Warrensburgh, town			
Delayed returns			
Total			

Washington County

	Births, 1912	Deaths, 1912	Marriages, 1912
Argyle, town	31	35	6
Argyle, village	2	10	.....
Cambridge, town	11	11	11
Cambridge, village	16	28	.....
Dresden, town	16	7	1
Easton, town	30	23	8
Fort Ann, town	40	23	16
Fort Ann, village	14	10	.....
Fort Edward, town	37	22	43
Fort Edward, village	91	55	.....
Granville, town	48	33	57
Granville, village	91	49	.....
Greenwich, town	44	35	36
Greenwich, village	34	52	.....
Hampton, town	19	14	7
Hartford, town			
Hebron, town			
Hudson Falls, village			
Jackson, town			
Kingsbury, town			
Putnam, town			
Salem, town			
Salem, village			
White Creek, town			
Whitehall, town			
Whitehall, village			
Delayed returns			
Total			

Wayne County

	Births, 1912	Deaths, 1912	Marriages, 1912
Arcadia, town	40	25	79
Butler, town	33	27	18
Clyde, village	60	56	.....
Galen, town	25	27	48
Huron, town	31	14	9
Lyons, town	37	41	70
Lyons, village	108	71	.....
Macedon, town	36	21	17
Macedon, village	11	8	.....
Marion, town	57	29	17
Newark, village	130	110	.....
Ontario, town	64	50	26
Palmyra, town	48	21	33
Palmyra, village			
Red Creek, village			
Rose, town			
Savannah, town			
Savannah, village			
Sodus, town			
Walworth, town			
Williamson, town			
Wolcott, town			
Wolcott, village			
Delayed returns			
Total	1,(		

Westchester County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Ardsley, village	18	7	.....	North Pelham, village	30	8	.....
Bedford, town	95	73	46	North Salem, town	21	20	7
Briarcliff Manor, village	16	12	.....	North Tarrytown, village	199	65	.....
Bronxville, village	27	26	.....	Ossining, town	4	2	87
Cortlandt, town	109	81	159	Ossining, village	178	177	.....
Croton-on-Hudson, village	31	18	.....	Peekskill, village	302	191	.....
Dobbs Ferry, village	77	48	.....	Pelham, town	1	0	20
Eastchester, town	34	18	51	Pelham, village	6	5	.....
Elmsford, village	36	9	.....	Pelham Manor, village	18	6	.....
Greenburgh, town	46	38	136	Pleasantville, village	60	39	.....
Harrison, town	98	54	49	Port Chester, village	498	195	.....
Hastings-on-Hudson, village	141	47	.....	Poundridge, town	9	11	11
Hillside, village	8	59	.....	Rye, town	4	8	271
Irvington, village	38	15	.....	Rye, village	53	42	.....
Larchmont, village	28	17	.....	Scarsdale, town	22	8	12
Lewisboro, town	22	18	7	Somers, town	25	21	13
Mamaroneck, town	14	11	45	Tarrytown, village	115	103	.....
Mamaroneck, village	147	97	.....	Tuckahoe, village	145	55	.....
Mount Kisco, village	66	31	.....	White Plains, town	0	7	142
Mount Pleasant, town	49	192	36	White Plains, village	453	235	.....
Mount Vernon, city	834	401	305	Yonkers, city	2,405	1,083	859
New Castle, town	25	24	15	Yorktown, town	44	36	15
New Rochelle, city	751	379	243	Delayed returns	134	.....	18
North Castle, town	50	27	19	Total	7,486	4,019	2,566

Wyoming County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Arcade, town	19	6	19	Orangeville, town	14	21	8
Arcade, village	38	21	.....	Perry, town	21	19	83
Attica, town	13	6	24	Perry, village	106	42	.....
Attica, village	18	28	.....	Pike, town	17	5	11
Bennington, town	26	33	6	Pike, village	3	10	.....
Castile, town	20	15	10	Sheldon, town	31	17	13
Castile, village	3[illegible]	21	.....	Silver Springs, village	19	9	.....
Covington, town	18	6	6	Warsaw, town	11	13	43
Eagle, town	31	10	8	Warsaw, village	40	61	.....
Gainesville, town	20	15	16	Wethersfield, town	21	8	4
Gainesville, village	3	4	.....	Delayed returns	14	.....	.....
Genesee Falls, town	20	6	4				
Java, town	38	26	11	Total	591	420	278
Middlebury, town	27	18	12				

Yates County

	Births, 1912	Deaths, 1912	Marriages, 1912		Births, 1912	Deaths, 1912	Marriages, 1912
Barrington, town	22	14	10	Penn Yan, village	65	84	.....
Benton, town	23	23	13	Potter, town	13	8	12
Dresden, village	4	3	.....	Rushville, village	7	9	.....
Dundee, village	9	19	.....	Starkey, town	21	16	21
Italy, town	10	11	6	Torrey, town	11	6	4
Jerusalem, town	39	35	16	Delayed returns	3	.....	.....
Middlesex, town	23	16	8				
Milo, town	45	30	69	Total	295	274	159

DEATHS BY AGE PERI

The following shows the mortality in
Buffalo and New York City during the year
sex, color, nativity, etc.:

TABLE 8

AGE	TOTAL		WHITE		NEGRO	
	Male	Female	Male	Female	Male	Female
Under 1....	5,062	3,905	4,985	3,843	75	60
1- 5......	1,569	1,395	1,534	1,356	35	37
5-10......	488	409	480	400	8	9
10-15......	357	320	352	312	4	8
15-20......	644	508	625	497	19	11
20-30......	2,219	1,641	2,166	1,590	48	50
30-40......	2,460	1,902	2,396	1,863	61	37
40-50......	3,032	2,263	2,962	2,213	65	47
50-60......	3,846	3,078	3,796	3,035	45	42
60-70......	4,978	4,387	4,923	4,355	53	31
70-80......	5,562	5,382	5,515	5,352	45	30
80 and over	3,387	3,898	3,373	3,881	12	16
Unknown..	103	36	101	36	2	.....
Total....	33,707	29,124	33,208	28,733	472	378

AGE	FOREIGN BORN		NATIVITY UNKNOWN		SINGLE	
	Male	Female	Male	Female	Male	Fema
Under 1....	13	12	.....	.....	5,062	3,90
1- 5......	30	33	4	1	1,569	1,39
5-10......	23	12	.....	1	488	40
10-15......	22	10	2	2	357	32
15-20......	105	76	9	1	634	44
20-30......	607	313	53	8	1,532	65
30-40......	648	391	92	11	980	37
40-50......	826	524	102	24	749	30
50-60.....	1,027	735	99	39	668	38
60-70......	1,518	1,367	86	52	568	42
70-80......	1,669	1,713	93	57	395	52
80 and over.	1,116	1,218	48	44	157	31
Unknown..	12	11	72	9	19	
Total....	7,616	6,415	660	240	13,178	9,5

Marital condition unknown, 974; Males, 717; Females, 257

DEATH RATE & PER CENT OF DEATHS AT DIFFERENT AGE PERIODS 1912

AGE PERIOD	Nº OF DEATHS	DEATH RATE PER 1000 LIVING AT ALL AGES	PER CENT OF TOTAL MORTALITY
UNDER 1 YEAR	24,681	2.6	17.3
1 YEAR TO 5 YEARS	10,106	1.1	7.1
5 " " 10 "	2,707	0.3	1.9
10 " " 20 "	4,440	0.46	3.1
20 " " 40 "	22,544	2.35	15.8
40 " " 60 "	31,371	3.27	22.0
60 " " 80 "	36,110	3.7	25.3
OVER 80	10,279	1.07	7.2
UNKNOWN	139	0.014	0.097
TOTAL DEATHS AT ALL AGES	142,377	14.8	100.0

TABLE 9

Whole State

Sex		Color		Social relations		Nativities	
Males	77,486	White	138,855	Married	49,991	United States	66,609
Females	64,891	Negro	3,390	Widowed	29,145	Foreign	71,304
Unknown		Mongolian	92	Single	61,470	Unknown	4,464
		Indian	40	Divorced*	121		
				Unknown	1,650		
Total	142,377	Total	142,377	Total	142,377	Total	142,377

* Of New York city and Buffalo only — the divorced for rest of State being included under the title " widowed."

TABLE 10

Death Rates and Per Cent of Deaths at Different Ages —Whole State

AGE PERIOD	Number of deaths	Death rate per 1,000 living at all ages	Per cent of total mortality
Under one year	24,681	2.6	17.3
One to five years	10,106	1.1	7.1
Five to ten years	2,707	0.3	1.9
Ten to twenty years	4,440	0.46	3.1
Twenty to forty years	22,544	2.35	15.8
Forty to sixty years	31,371	3.27	22.0
Sixty to eighty years	36,110	3.70	25.3
Over eighty years	10,279	1.07	7.2
Unknown	139	0.014	0.097
Total deaths at all ages	142,377	14.8	100.0

TABLE 11

Death Rate and Per Cent of Deaths from Different Causes

	Number of deaths	Death rate per 1,000 living	Per cent of total mortality
1 General diseases	37,178	3.87	26.1
2 Diseases of nervous system	11,326	1.18	8.0
3 Diseases of circulatory system	21,661	2.26	15.2
4 Diseases of respiratory system	19,732	2.06	13.9
5 Diseases of digestive system	15,467	1.61	10.9
6 Diseases of genito-urinary system	13,429	1.40	9.4
7 The puerperal state	1,256	0.13	0.88
8 Diseases of skin and cellular tissue	631	0.06	0.44
9 Diseases of organs of locomotion	235	0.02	0.16
10 Malformations	1,384	0.14	0.97
11 Early infancy	7,940	0.83	5.6
12 Old age	1,795	0.19	1.2
13 External causes	10,146	1.06	7.1
14 Ill-defined causes	197	0.02	0.01
Total deaths from all causes	142,377	14.8	100.0

DEATHS OF PERSONS 100 YEARS OF AG

Thirty-seven returns of deaths of indivi the traditional three score years and ten by century were recorded at the Department d Twenty-six of the centenarians were female total number were known to be natives of th that in a number of instances those filling cates were unable to give a better cause of

NAME	Place of death	Age	Nativity
Caraulo Asposito	Brooklyn	104	Italy
Jane E. Fraser	Brooklyn	100	U. S
Elisa Redmond	Manhattan	102	Ireland
Mary E. Jones	Brooklyn	103	Wales
Henrietta Willson	Manhattan	108	U. S
Coleman Stewart	Manhattan	101	U. S
Mary Carter	Manhattan	110	U. S
Maria DeFilippia	Manhattan	103	Italy
Ellen Horgan	Manhattan	104	Ireland
Anna Redman	Buffalo	101	Poland
Maurice Dolan	Buffalo	100	Ireland
Edward Morris	Rochester	100	U. S
William Linfor	Syracuse	100	England
Christina H. Winters	Schenectady	102	U. S
Helen Anthony	Schenectady	107	U. S
Wm. H. Thornton	Elmira	100	U. S
Melinda Hogle	Mt. Vernon	100	U. S
Mary Murphy	Ogdensburg	103	Unknown
Araminta Hews	Oneida	102	U. S
Edith Duprey	Parishville	103	Canada
Mary Van Cour	Hammond	100	Canada
Susan C. Weller	Lysander	100	U. S
Elisa Spalding	Delhi	102	Unknown
Benjamin Richardson	Frankfort	100	England
Mitchell Smith	Grand View	100	Austria
Michael Philips	Hartford	100	U. S
Katherine Kame	Herkimer	101	Ireland
Martha Kees	Osceola	102	U. S
Katharine McNerney	E. Bloomfield	103	Ireland
Lucy L. DeWitt	Morristown	100	Unknown
Urania Smith	Caroline	101	U. S
Margaret A. Jennings	Sullivan	100	U. S
George C. Pane	Odessa	100	U. S
Mary A. Hort	Poundridge	101	U. S
Morits Golden	N. Hempstead	101	Russia
Martha Portus	Dewitt	101	Ireland
Mary McCabe	Cairo	105	Ireland

COMPARATIVE MORTALITY
TWELVE PROMINENT CAUSES OF DEATH
NEW YORK STATE 1912

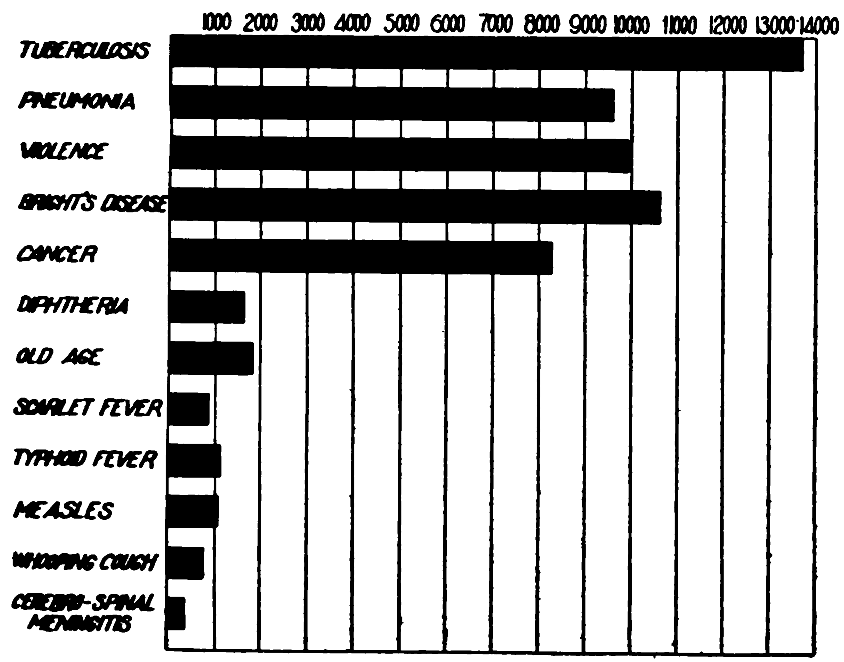


TABLE 12

Seasonal Fatality from Chief Causes of Death

	January	February	March	April	May	June
Tuberculosis of lungs	1,[illegible]	1,274	1,455	1,362	1,254	1,[illegible]
Pneumonia	1,[illegible]	1,247	1,224	962	900	[illegible]
Violence	740	[illegible]	[illegible]	[illegible]	855	[illegible]
Bright's disease	899	905	935	1,015	903	846
Cancer	674	651	662	692	712	651
Diphtheria	179	170	172	156	139	128
Scarlet fever	68	84	139	157	97	77
Typhoid fever	107	70	70	62	87	68
Measles	57	95	133	187	165	141
Total mortality in the State from all causes	13,088	12,607	13,346	12,973	12,230	10,533

	July	August	September	October	November	December	Total
Tuberculosis of lungs	1,039	1,031	894	1,001	1,001	1,097	13,716
Pneumonia	357	323	355	556	709	1,125	9,560
Violence	1,098	889	794	798	794	826	9,904
Bright's disease	840	778	745	870	909	982	10,613
Cancer	695	696	661	714	687	748	8,250
Diphtheria	101	83	81	102	145	168	1,624
Scarlet fever	42	29	13	26	28	59	789
Typhoid fever	82	122	139	146	89	79	1,128
Measles	95	56	23	16	29	51	1,050
Total mortality in the State from all causes	11,471	11,466	10,550	11,104	10,551	12,969	142,377

TABL

Deaths from Principal Causes in
Popula

COUNTY	PULMONARY TUBERCULOSIS	
	Number	Rate per 100,000 population
Albany	308	175.8
Allegany	19	46.5
Broome	78	95.8
Cattaraugus	41	62.2
Cayuga	53	78.5
Chautauqua	64	58.7
Chemung	48	86.3
Chenango	30	85.6
Clinton	54	112.2
Columbia	49	111.3
Cortland	26	89.1
Delaware	28	62.0
Dutchess	143	159.9
Erie	629	113.8
Essex	38	116.3
Franklin	194	418.1
Fulton	40	87.7
Genesee	23	59.9
Greene	44	146.7
Hamilton	4	94.3
Herkimer	56	97.2
Jefferson	54	67.1
Kings	2,440	136.6
Lewis	17	70.6
Livingston	58	151.1
Madison	26	66.3
Monroe	336	110.8
Montgomery	58	94.9
Nassau	84	92.7
New York	5,646	191.9
Niagara	74	77.
Oneida	204	127.
Onondaga	204	96.
Ontario	38	72.
Orange	193	157.
Orleans	33	102.
Oswego	67	92.
Otsego	40	85.
Putnam	12	80.
Queens	357	110.
Rensselaer	217	177.
Richmond	145	157.
Rockland	47	97.
St. Lawrence	103	116.
Saratoga	60	97.
Schenectady	107	111.
Schoharie	17	73.
Schuyler	14	104.
Seneca	49	182.
Steuben	62	74.
Suffolk	183	183.
Sullivan	164	490.
Tioga	18	71.
Tompkins	22	65.
Ulster	123	130.
Warren	36	110.
Washington	42	87.
Wayne	37	62.
Westchester	338	109.
Wyoming	18	55.
Yates	9	49.

TABLE 13 — (*Concluded*)

COUNTY	DIARRHEA (UNDER 2 YEARS)		INFLUENZA		CANCER	
	Number	Rate	Number	Rate	Number	Rate
Albany	92	52.5	26	14.8	199	113.6
Allegany	6	14.7	20	49.0	48	117.6
Broome	48	59.0	16	19.7	92	113.1
Cattaraugus	19	28.8	12	18.2	63	95.6
Cayuga	46	68.2	12	17.8	73	108.2
Chautauqua	55	50.4	21	19.3	97	88.9
Chemung	18	32.3	13	23.4	63	113.3
Chenango	15	42.8	18	51.4	52	148.5
Clinton	20	41.5	21	43.6	31	64.4
Columbia	21	47.7	13	29.5	45	102.2
Cortland	1	3.4	8	27.4	31	106.2
Delaware	11	24.4	15	33.2	45	99.7
Dutchess	43	48.1	11	12.3	81	90.6
Erie	691	125.1	26	4.7	486	87.9
Essex	16	48.9	6	18.3	31	94.7
Franklin	29	62.5	19	40.9	38	81.9
Fulton	13	28.5	15	32.9	38	83.4
Genesee	15	39.0	14	36.4	24	62.5
Greene	9	30.0	8	26.7	42	140.0
Hamilton	0	0.0	3	70.7	2	47.2
Herkimer	44	76.4	6	10.4	47	81.6
Jefferson	18	22.4	15	18.6	78	96.9
Kings	1,478	82.8	114	6.4	1,253	70.2
Lewis	2	8.8	5	20.8	16	66.4
Livingston	11	28.7	4	10.4	44	114.7
Madison	14	35.7	10	25.5	40	102.0
Monroe	277	91.4	27	8.9	270	89.1
Montgomery	75	112.7	10	16.4	51	83.4
Nassau	72	79.5	12	13.2	81	89.4
New York	2,099	70.4	141	4.8	2,497	84.6
Niagara	88	92.1	14	14.6	68	77.2
Oneida	201	127.1	32	19.9	165	102.8
Onondaga	136	64.6	22	10.5	217	103.1
Ontario	23	44.0	16	30.6	51	97.6
Orange	80	65.4	33	27.0	99	81.0
Orleans	24	74.3	5	15.5	28	86.7
Oswego	46	63.4	11	15.2	74	102.0
Otsego	9	19.2	17	36.3	61	130.1
Putnam	9	60.3	1	6.7	10	67.0
Queens	281	86.8	9	2.8	222	98.6
Rensselaer	63	51.4	26	21.2	130	106.1
Richmond	100	108.8	3	3.2	100	108.8
Rockland	32	66.6	6	12.5	39	81.2
St. Lawrence	34	38.5	25	28.3	82	92.9
Saratoga	30	48.5	16	25.9	49	79.2
Schenectady	98	102.9	9	9.4	72	74.9
Schoharie	6	25.8	10	42.9	26	111.7
Schuyler	1	7.5	3	22.4	19	141.7
Seneca	8	29.8	10	37.3	36	134.2
Steuben	31	37.1	15	17.9	86	102.9
Suffolk	50	50.1	11	11.0	87	87.2
Sullivan	9	26.9	7	20.9	36	107.7
Tioga	11	43.6	3	11.9	25	99.0
Tompkins	11	32.8	18	53.7	32	95.5
Ulster	21	22.9	21	22.3	80	84.9
Warren	15	46.3	11	33.9	26	80.2
Washington	29	60.3	17	35.4	37	76.7
Wayne	24	47.2	11	21.6	48	94.4
Westchester	288	93.6	13	4.2	245	79.6
Wyoming	5	15.5	10	31.1	28	87.0
Yates	1	5.5	11	59.9	14	76.2

TABLE

Mortality from Principal C

The following shows the reporte
pal causes in the cities and village
and rates per 100,000 population.

CITY	Population	c
City of New York	5,114,090	1
Borough of Manhattan	2,435,102	1
Borough of Bronx	503,181	1
Borough of Brooklyn	1,760,848	1
Borough of Queens	323,089	1
Borough of Richmond	91,870	1
Buffalo	444,915	1
Rochester	234,514	1
Syracuse	146,133	1
Albany	101,469	2
Yonkers	88,132	1
Schenectady	79,444	1
Utica	79,297	1
Troy	77,058	1
Binghamton	50,864	1
Elmira	37,833	1
Auburn	35,637	1
Amsterdam	34,645	1
Jamestown	33,693	1
Mount Vernon	33,631	1
New Rochelle	32,707	1
Niagara Falls	32,263	
Poughkeepsie	29,199	
Newburgh	28,478	
Watertown	27,388	
Kingston	26,133	
Cohoes	25,000	
Oswego	23,814	
Rome	21,931	
Gloversville	21,576	
Lockport	18,215	
Dunkirk	18,137	
White Plains, v	17,892	
Ogdensburg	16,439	
Peekskill, v	16,170	
Lackawanna	16,011	
Glens Falls	15,510	
Olean	15,496	
Watervliet	15,341	
Middletown	15,147	
Ithaca	14,940	
Corning	13,861	
Hornell	13,830	
Port Chester, v	13,537	
Ossining, v	12,886	
Little Falls	12,831	
North Tonawanda	12,779	
Geneva	12,574	
Saratoga Springs, v	12,555	
Batavia, v	12,246	
Hudson	11,894	
Cortland	11,643	
Plattsburg	11,602	
Fulton	11,230	
Johnstown	10,755	
Rensselaer	10,719	
Oneonta	10,141	
Port Jervis	9,564	
Tonawanda	8,464	
Oneida	8,317	
Urban	**7,260,570**	
Rural	**2,331,688**	
Total State	**9,592,258**	

TABLE

Deaths in State

NAME OF INSTITUTION AND LOCATION	Total deaths
Auburn State Prison	17
Binghamton State Hospital	184
Bloomingdale Asylum, White Plains	22
Craig Colony, Sonyea	140
Dannemora State Hospital	31
Elmira State Reformatory	6
Gowanda State Hospital	59
Hudson River State Hospital, Poughkeepsie	243
Long Island State Hospital, Kings Park	280
Manhattan State Hospital, Central Islip	429
Matteawan State Hospital	31
Middletown State Hospital	113
State Soldiers and Sailors' Home, Bath	199
Rochester State Hospital	157
Rome Custodial Asylum	81
St. Lawrence State Hospital, Ogdensburg	197
Sing Sing Prison, Ossining	23
Utica State Hospital	130
Willard State Hospital, Towns of Romulus and Ovid	156
Total	2,498

NAME OF INSTITUTION AND LOCATION	Pulmonary tuberculosis	Other forms of tuberculosis	Cancer and other malignant tumors
Auburn State Prison	2	2	...
Binghamton State Hospital	26	2	
Bloomingdale Asylum, White Plains	...	...	...
Craig Colony, Sonyea	26	5	
Dannemora State Hospital	14	1	...
Elmira State Reformatory	4	...	...
Gowanda State Hospital	3	...	
Hudson River State Hospital, Poughkeepsie	40	6	
Long Island State Hospital, Kings Park	28	1	
Manhattan State Hospital, Central Islip	60	1	
Matteawan State Hospital	6	...	
Middletown State Hospital	17	1	
State Soldiers and Sailors' Home, Bath	9	2	
Rochester State Hospital	15	2	
Rome Custodial Asylum	21	4	..
St. Lawrence State Hospital, Ogdensburg	21	3	
Sing Sing Prison, Ossining	1	...	
Utica State Hospital	13	1	
Willard State Hospital, Towns of Romulus and Ovid	28	...	
Total	334	31	

TABLE 15 — (*Concluded*).

NAME OF INSTITUTION AND LOCATION	Other diseases of the digestive system	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes
Auburn State Prison	1	1	....	....	....	1	....	1	1	5
Binghamton State Hospital	5	21	1	....	....	1	1	....	....	4
Bloomingdale Asylum, White Plains	2	1	....	....	....	....	....	....	....	2
Craig Colony, Sonyea	4	4	1	....	....	2	....	1	....	1
Dannemora State Hospital	1	2	....	....	....	....	....	....	....	2
Elmira State Reformatory	1	....	....	....	....	....	....	....	....	....
Gowanda State Hospital	2	6	....	....	1	1	1	....	....	1
Hudson River State Hospital, Poughkeepsie	8	16	2	....	....	1	1	....	....	4
Long Island State Hospital, Kings Park	4	15	2	....	....	3	2	....	....	4
Manhattan State Hospital, Central Islip	9	44	7	....	....	1	2	....	....	1
Matteawan State Hospital	....	6	....	....	....	1	....	....	....	1
Middletown State Hospital	3	7	1	....	....	2	2	....	....	1
State Soldiers and Sailors' Home, Bath	12	20	10	....	....	6	....	....	3	8
Rochester State Hospital	4	1	2	1	....	2	2	....	1	....
Rome Custodial Asylum	4	1	....	....	....	....	....	....	....	1
St. Lawrence State Hospital, Ogdensburg	5	10	2	....	....	4	....	....	....	4
Sing Sing Prison, Ossining	....	2	....	....	....	....	....	....	....	15
Utica State Hospital	4	12	....	....	....	2	1	....	....	3
Willard State Hospital, Towns of Romulus and Ovid	5	8	1	1	....	1	....	1	....	2
Total	74	177	29	2	1	28	12	3	5	59

TABLE 16 — *De*[illegible]

	Jan.
All causes	*13,088*
I. GENERAL DISEASES	*3,300*
Typhoid fever	107
Typhus fever	.....
Relapsing fever	.....
Malaria	5
Smallpox	1
Measles	57
Scarlet fever	68
Whooping cough	50
(a) Diphtheria	173
(b) Croup	6
Influenza	149
Miliary fever	.....
Asiatic cholera	.....
Dysentery	7
Plague	.....
Yellow fever	.....
Leprosy	.....
Erysipelas	48
Other epidemic diseases	13
Purulent infection and septicemia	24
Glanders	.....
Anthrax	.....
Rabies	2
Tetanus	8
Pellagra	.....
Tuberculosis of lungs	1,238
Acute miliary tuberculosis	19
Tuberculous meningitis	7[illegible]
Abdominal tuberculosis	3[illegible]
Pott's disease	[illegible]
White swelling	[illegible]
Tuberculosis of other organs	2[illegible]
Disseminated tuberculosis	[illegible]
Rickets	[illegible]
Syphilis	6[illegible]
Gonococcus infections	.....
Cancer of mouth	3[illegible]
Cancer of stomach and liver	23[illegible]
Cancer of peritoneum, intestines and rectum	10[illegible]
Cancer of skin	2[illegible]
Cancer of breast	5[illegible]
Cancer of female genital organs	9[illegible]
Cancer of other or unspecified organs	13[illegible]
Tumor (noncancerous)	
Acute articular rheumatism	2[illegible]
Chronic articular rheumatism	3[illegible]
Chronic rheumatism and gout	1[illegible]
Scurvy	
Diabetes	15[illegible]
Exophthalmic goiter	1[illegible]
Addison's disease	
Leukemia	[illegible]
Anemia, chlorosis	[illegible]
Alcoholism	1[illegible]
Chronic lead poisoning	.....
Other chronic occupational poisonings	.....
Other chronic poisonings	
Other general diseases	[illegible]
II. NERVOUS SYSTEM	*1,0*[illegible]
Encephalitis	
Simple meningitis	[illegible]
Cerebrospinal fever	[illegible]
Locomotor ataxia	[illegible]
Other diseases of spinal cord	
Apoplexy, cerebral hemorrhage	6[illegible]
Softening of brain	
Paralysis without specified cause	
General paralysis of insane	

Detailed Statem

	Jan.
II. NERVOUS SYSTEM—(*Concluded*).	
Other forms of mental alienation....	21
Other diseases of brain............	11
Epilepsy..........................	35
Acute anterior poliomyelitis........	1
Convulsions (nonpuerperal)........	9
Convulsions of infants.............	37
Chorea...........................	4
Other diseases of nervous system...	37
Diseases of the eye and its annexa..	......
Diseases of the ear................	14
III. CIRCULATORY SYSTEM..............	*2,309*
Pericarditis.......................	21
Acute endocarditis................	97
Organic disease of the heart........	1,587
Angina pectoris...................	64
Diseases of the arteries............	470
Embolism and thrombosis..........	59
Diseases of the veins..............	4
Diseases of the lymphatic system...	3
Hemorrhages (except of lungs).....	3
Other diseases of circulatory system.	1
IV. RESPIRATORY SYSTEM..............	*2,406*
Diseases of nasal fossae............	......
Diseases of the larynx.............	12
Diseases of the thyroid body.......	4
Acute bronchitis...................	201
Chronic bronchitis.................	65
Bronchopneumonia................	758
Pneumonia.......................	1,257
Pleurisy..........................	44
Pulmonary congestion.............	31
Gangrene of lungs................	3
Asthma..........................	15
Pulmonary emphysema............	4
Other diseases of the respiratory system..........................	12
V. DIGESTIVE SYSTEM..................	*88*
Diseases of the mouth and its annexa.	5
Diseases of pharynx...............	19
Diseases of the esophagus..........	2
Ulcer of stomach	48
Other diseases of the stomach (cancer excepted)......................	66
Diarrhea and enteritis (under 2 years)	21
Diarrhea and enteritis (2 years and over).........................	75
Intestinal parasites...............	1
Hernia...........................	68
Obstruction of intestines...........	54
Appendicitis and typhlitis..........	83
Other diseases of intestines........	[illegible]
Acute yellow atrophy of liver......	.....
Hydatid tumor of liver...........	.....
Cirrhosis of liver..................	14
Biliary calculi....................	2
Other diseases of liver............	2
Diseases of the spleen.............	.....
Simple peritonitis (nonpuerperal)...	3
Other diseases of digestive system (cancer and tuberculosis excepted)	[illegible]
VI. GENITO-URINARY SYSTEM............	*1,14*
Acute nephritis...................	12
Bright's disease..................	89
Other diseases of kidneys and annexa.	2
Calculi of urinary passage.........	[illegible]
Diseases of bladder...............	3

Detailed Statem

	Jan.
VI. GENITO-URINARY SYSTEM—(*Concl'd*).	
Other diseases of urethra, urinary abscess, etc.	3
Diseases of prostate	17
Nonvenereal diseases of the male genital organs	1
Metritis	.....
Uterine hemorrhage (nonpuerperal)	.....
Uterine tumor (noncancerous)	15
Other diseases of uterus	5
Cysts and other tumors of the ovary	7
Salpingitis and other diseases of female genital organs	13
Nonpuerperal diseases of the breast (cancer excepted)	.....
VII. CHILDBIRTH	*119*
Accidents of pregnancy	31
Puerperal hemorrhage	17
Other accidents of labor	10
Puerperal septicemia	34
Puerperal albuminuria and convulsions	24
Puerperal phlegmasia alba dolens, embolus following childbirth (not otherwise defined)	3
Puerperal diseases of the breast	.....
VIII. DISEASES OF THE SKIN	*55*
Gangrene	24
Furuncle	2
Acute abscess	19
Other diseases of the skin	10
IX. LOCOMOTOR SYSTEM	*22*
Diseases of bones (tuberculosis excepted)	19
Diseases of joints (tuberculosis and rheumatism excepted)	2
Amputation	.....
Other diseases of organs of locomotion	1
X. MALFORMATIONS	.....
Congenital malformations (stillbirths not included)	13[illegible]
XI. EARLY INFANCY	*65[illegible]*
Premature birth	15[illegible]
Congenital debility, icterus and sclerema	40[illegible]
Other diseases of early infancy	9[illegible]
Lack of care	[illegible]
XII. OLD AGE	.....
Senility	20[illegible]
XIII. VIOLENCE	*75[illegible]*
Suicide by poison	2[illegible]
Suicide by asphyxia	1[illegible]
Suicide by hanging or strangulation	1[illegible]
Suicide by drowning	
Suicide by firearms	2[illegible]
Suicide by cutting instruments	1[illegible]
Suicide by jumping from high places	[illegible]
Suicide by crushing	.....
Other suicides	.....
Poisoning by food	[illegible]
Other acute poisonings	1[illegible]
Conflagration	1[illegible]
Burns (conflagration excepted)	8[illegible]
Inhalation of poisonous gases	8[illegible]

Detailed Statement

	Jan.	Feb.
XIII. VIOLENCE—(*Concluded*).		
Fractures	50	
Accidental drowning	23	
Dislocations	1	....
Heat and sunstroke	1	....
Cold and freezing	12	
Lightning	......	...
Electricity (lightning excepted)	3	
Starvation, privation, etc	......	...
Accidental gunshot wounds	13	
Injuries by machinery	12	
Injuries in mines and quarries	1	
Railroad accidents and injuries	111	
Injuries by horses and vehicles	11	
Other accidental traumatisms	123	
Suffocation	7	
Injuries at birth	44	
Homicide by firearms	19	
Homicide by cutting and piercing instruments	4	
Homicide by other means	11	
Other external violence	12	
XIV. ILL-DEFINED DISEASES	*15*	
Dropsy	......	
Sudden death	......	
Heart failure	6	
Inanition	......	.
Debility (over 3 months)	......	.
Marasmus	6	
Fever	......	.
Other ill-defined diseases	1	
Unknown	2	.

·— (*Concluded*)

Occurring in the State During 1912 — (Concluded)

	Aug.	Sept.	Oct.	Nov.	Dec.	Total
XIII. Violence—(*Concluded*).						
Fractures	84	66	60	59	70	780
Accidental drowning:	150	94	76	41	30	1,039
Dislocations	1	1	......	......	......	6
Heat and sunstroke	12	3	......	......	......	125
Cold and freezing	......	1	1	......	7	39
Lightning	2	......	......	......	......	21
Electricity (lightning excepted)	9	14	9	3	3	82
Starvation, privation, etc	2	......	......	2	......	4
Accidental gunshot wounds	5	4	18	16	14	91
Injuries by machinery	16	10	12	8	14	142
Injuries in mines and quarries	2	3	4	......	1	18
Railroad accidents and injuries	140	153	144	143	143	1,651
Injuries by horses and vehicles	30	29	43	27	13	275
Other accidental traumatisms	134	112	114	135	124	1,424
Suffocation	12	3	4	6	5	69
Injuries at birth	55	53	55	63	63	685
Homicide by firearms	13	16	22	19	14	236
Homicide by cutting and piercing instruments	9	8	7	3	10	81
Homicide by other means	15	11	10	7	3	117
Other external violence	26	25	26	26	12	242
XIV. Ill-Defined Diseases	*20*	*17*	*17*	*8*	*12*	*127*
Dropsy	1	......	2	1	3	21
Sudden death	......	......	......	......	......	2
Heart failure	3	1	2	4	4	56
Inanition	......	......	......	......	......	......
Debility (over 3 months)	......	......	......	......	......	1
Marasmus	7	10	6	......	2	63
Fever	......	1	......	......	......	2
Other ill-defined diseases	9	5	7	......	3	43
Unknown	......	......	......	3	......	9

TABLE 17

Population of the Sanitary

DISTRICTS	1900	1905
Maritime	3,753,614	4,393,861
Hudson Valley	690,000	703,893
Adirondack and Northern	394,772	408,116
Mohawk Valley	408,974	444,741
Southern Tier	428,543	438,936
East Central	401,082	414,209
West Central	315,945	315,677
Lake Ontario and Western	876,206	947,875
Entire State	7,269,136	8,067,308

TABLE 18

Relative Area, Density of Population and Death Rates in the Sanitary Districts for 1912

DISTRICTS	Area in square miles (land)	Population per square mile	Urban death rate	Rural death rate	Total death rate	PERCENTAGE OF DEATHS			
						Under 1 year	Between 1 and 5 years	At 60 years and over	From epidemic diseases
Maritime	1,946	2,884	14.3	16.1	14.3	19.3	9.0	24.1	5.1
Hudson Valley	5,679	130	19.0	14.7	16.7	13.1	4.7	42.4	5.0
Adirondack and Northern	13,353	30	18.8	14.1	14.9	13.7	3.1	47.8	4.2
Mohawk Valley	5,179	97	16.1	14.9	15.5	16.8	5.2	41.2	4.1
Southern Tier	6,419	72	14.9	15.9	15.5	10.9	3.3	52.0	3.9
East Central	6,252	70	16.1	16.1	16.1	13.0	3.3	47.8	4.4
West Central	4,538	70	16.4	16.1	16.2	10.1	3.9	51.0	5.0
Lake Ontario and Western	4,199	264	14.9	14.3	14.7	13.4	6.1	34.7	4.8
Entire State	47,620	202	14.7	15.3	14.8	17.3	7.1	32.6	5.1

TABLE 19 — *Total Mortalit*

MONTHS	Total deaths	Annual death rate per 1,000 population	Deaths under 1 year	Dea 1 t ye
January	13,088	16.4	1,905	
February	12,607	15.8	1,829	
March	13,546	16.9	2,138	1,
April	12,973	16.2	2,100	1,
May	12,220	15.3	2,038	1
June	10,523	13.2	1,674	
July	11,471	14.4	2,487	
August	11,466	14.3	2,792	
September	10,559	13.2	2,428	
October	11,104	13.9	2,043	
November	10,551	13.2	1,621	
December	12,269	15.3	1,626	
Total	142,377	14.8	24,681	1

TABLE 19 — (*Con*

Total Mortality by Months

MONTHS	EPIDE				
	Typhoid fever	Malaria	Small-pox	Measles	Scarle fever
January	107	5	1	57	
February	70	.....	1	95	
March	70	1	.....	135	1
April	69	1	.....	187	1
May	87	4	.....	165	
June	68	2	.....	141	
July	82	7	.....	95	
August	122	6	.....	56	
September	139	8	.....	23	
October	146	10	.....	16	
November	89	5	1	29	
December	79	5	1	51	
Total	1,128	51	4	1,050	

CHART SHOWING TOTAL
DEATHS BY MONTHS
DURING 1912 IN NEW YORK STATE
FROM THE
CHIEF CAUSES OF DEATH

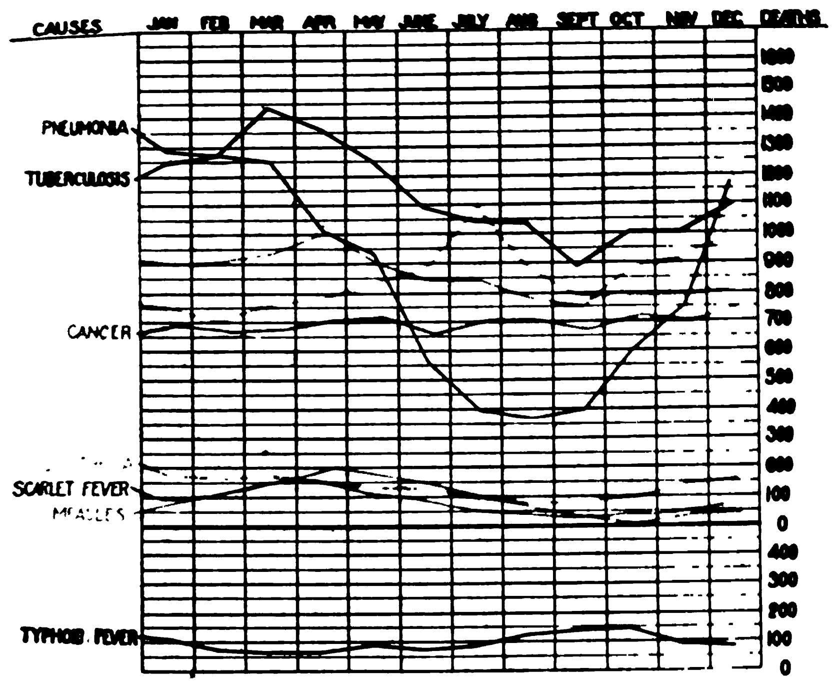


TABLE 19 — (*Continued*)

Total Mortality by Months — (Continued)

MONTHS	Pulmonary tuberculosis	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and enteritis (under 2 years)	Diarrhea and enteritis (over 2 years)
January....	1,238	160	674	150	414	1,066	2,309	1,257	1,149	212	75
February ...	1,274	137	651	152	345	1,011	2,082	1,247	1,009	197	70
March......	1,435	228	662	132	381	1,068	2,093	1,224	1,348	266	77
April......	1,362	241	699	138	400	963	1,937	982	1,090	257	64
May......	1,254	248	712	136	392	926	1,810	900	973	278	96
June......	1,090	196	651	130	320	821	1,574	525	700	360	109
July......	1,039	198	695	138	354	859	1,483	357	512	1,228	184
August......	1,031	157	696	148	371	779	1,443	323	479	1,674	245
September..	894	174	661	126	354	823	1,408	355	502	1,270	222
October..	1,001	171	714	146	333	861	1,728	556	691	740	143
November.	1,001	167	687	124	310	849	1,724	709	714	321	78
December...	1,097	136	748	158	377	947	2,070	1,125	1,016	202	63
Total....	13,716	2,253	8,259	1,678	4,360	10,993	21,661	9,560	10,172	7,036	1,426

TABLE 19 — (*Concluded*)

Total Mortality by Months — (Concluded)

MONTHS	Other diseases of the digestive system	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 mos.)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births	Annual birth rate per 1,000 population
January....	598	899	242	119	405	613	93	34	223	472	19,589	850	24 5
February...	535	903	235	116	386	549	100	52	100	463	18,570	838	23 2
March....	643	933	290	136	414	604	126	36	179	487	19,261	899	24 1
April.......	621	1,015	265	139	432	613	127	40	184	503	18,483	817	23 1
May.....	620	893	219	107	222	677	133	23	162	710	18,031	915	22 5
June	530	846	211	99	246	732	114	30	139	514	18,417	857	22 9
July.......	615	840	250	85	489	968	97	43	139	426	19,920	877	24 9
August	603	778	212	100	132	746	106	37	153	814	19,775	863	24 7
September	515	745	213	83	517	642	117	35	148	385	18,667	814	22 3
October	500	870	221	80	474	661	98	39	173	393	18,947	864	23 7
November	537	909	212	81	371	654	111	29	132	409	17,887	822	22 3
December	539	982	216	111	364	681	118	27	165	404	19,564	844	24 0
Total..	7,006	10,613	2,816	1,256	4,452	8,130	1,349	434	1,992	5,980	227,120	10,250	23 6

TABLE 20 — *Total Mortality for the Year*

SANITARY DISTRICTS	Population, U. S. census estimate 1912	Total deaths	Ages: Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
MARITIME DISTRICT:								
City of New York:								
Borough of Manhattan	2 435 102	36 559	7 661	3 468	1 890	6 798	9 005	7 747
Borough of the Bronx	503 181	6 944	1 112	586	472	1 529	1 673	1 572
Borough of Brooklyn	1 760 848	23 994	4 455	2 226	1 384	4 096	5 677	6 156
Borough of Queens	323 089	3 978	784	330	242	636	984	1 002
Borough of Richmond	91 870	1 544	254	103	75	233	338	536
Totals	5 114 090	73 019	14 266	6 718	4 053	13 292	17 677	17 013
Freeport, village (Nassau co.)	5 209	73	18	2	2	13	11	27
Hempstead, town (Nassau co.)	39 303	434	76	27	17	60	87	167
North Hempstead, town (Nassau co.)	19 515	335	81	25	19	63	67	78
Oyster Bay, town (Nassau co.)	22 387	307	51	24	23	29	58	121
Rockville Center, village (Nassau co.)	4 128	47	6	2	2	3	10	24
Amityville, village (Suffolk co.)	2 556	84	4	0	6	12	28	34
Babylon, village (Suffolk co.)	2 709	67	10	2	5	11	12	26
Brookhaven, town (Suffolk co.)	13 021	228	19	15	24	25	42	103
Greenport, village (Suffolk co.)	3 279	49	8	2	0	6	10	23
Huntington, town (Suffolk co.)	12 834	161	18	8	10	19	37	69
Patchogue, village (Suffolk co.)	3 994	41	6	3	3	6	8	15
Sag Harbor, village (Suffolk co.)	3 570	46	9	1	2	6	11	17
Southold, town (Suffolk co.)	8 033	71	16	4	3	3	8	37
Rest of county	49 861	1 266	74	19	39	263	413	458
Dobbs Ferry, village (Westchester co.)	3 441	47	11	4	6	5	7	13
Greenburgh, town (Westchester co.)	6 405	54	21	4	4	5	5	15
Hastings-on-Hudson, vil. (Westchester co.)	5 227	47	11	7	3	4	9	13
Irvington, village (Westchester co.)	2 280	15	0	0	0	4	5	6
Mamaroneck, town (Westchester co.)	5 594	124	22	6	8	13	30	45
Mount Vernon (Westchester co.)	33 631	401	79	43	21	48	90	120
New Rochelle (Westchester co.)	32 707	379	76	52	20	69	73	89
North Tarrytown, village (Westchester co.)	5 723	64	17	10	5	8	3	19
Ossining, village (Westchester co.)	12 886	200	22	15	13	39	43	67
Peekskill, village (Westchester co.)	16 170	191	39	18	7	25	31	71
Port Chester, village (Westchester co.)	13 537	195	62	20	11	28	27	46
Rye, town (Westchester co.)	6 859	49	6	4	5	4	17	13
Tarrytown, village (Westchester co.)	5 703	104	12	7	9	16	20	40
White Plains, village (Westchester co.)	17 892	256	51	25	10	45	54	70
Yonkers (Westchester co.)	88 132	1 083	275	101	74	182	198	253
Rest of county	51 256	854	116	61	41	153	170	308
Totals for the district	5 611 932	80 291	15 482	7 229	4 445	14 459	19 261	19 400
HUDSON VALLEY DISTRICT:								
Albany (Albany co.)	101 469	2 046	262	87	67	354	496	780
Cohoes (Albany co.)	25 000	440	90	26	20	79	95	128
Green Island, village (Albany co.)	4 707	76	11	6	3	13	21	22
Watervliet (Albany co.)	15 341	269	61	18	11	32	58	87
Rest of county	23 560	427	50	18	12	51	77	217
Hudson (Columbia co.)	11 894	211	34	14	5	25	36	95
Rest of county	32 128	479	47	11	13	53	77	278
Fishkill, town (Dutchess co.)	3 149	43	7	5	3	9	3	16
Fishkill Landing, village (Dutchess co.)	3 894	61	10	2	7	9	9	23
Matteawan, village (Dutchess co.)	6 960	151	14	5	9	28	41	54
Poughkeepsie (Dutchess co.)	29 199	489	73	31	22	65	102	196
Wappingers Falls, village (Dutchess co.)	3 099	39	7	3	3	2	8	16
Rest of county	43 154	880	60	34	31	124	198	433
Catskill, village (Greene co.)	5 296	82	11	5	2	12	15	37
Coxsackie, town (Greene co.)	3 454	60	9	3	3	10	10	25
Rest of county	21 247	342	36	7	12	34	54	198
Cornwall, village (Orange co.)	2 942	44	5	2	5	15	6	11
Goshen, town (Orange co.)	5 173	110	14	10	2	12	17	55
Middletown (Orange co.)	15 147	374	38	9	15	46	106	159
Montgomery, town (Orange co.)	3 694	38	3	2	2	5	11	15
Newburgh (Orange co.)	28 478	519	66	31	19	72	112	218
Port Jervis (Orange co.)	9 564	154	21	1	4	26	41	61

1912 *in the Sanitary Districts*

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
MARITIME DISTRICT:											
City of New York:											
Borough of Manhattan	192	7		309	314	167	539	103	220	130	4 066
Borough of the Bronx	26	1	…	109	54	12	125	38	22	20	1 580
Borough of Brooklyn	231	10	2	203	225	86	400	114	85	44	2 440
Borough of Queens	48	2	…	41	16	21	55	9	4	10	357
Borough of Richmond	2	…		11	6	5	17	3	2	3	145
Totals	499	20	2	673	615	291	1 126	267	333	207	8 588
Freeport, village (Nassau co.)	1					2		2			4
Hempstead, town (Nassau co.)	1	2		3	2	3	11	2	2	2	42
North Hempstead, town (Nassau co.)	8	1		1			6	3		1	14
Oyster Bay, town (Nassau co.)	5	2		5		5	2	4			22
Rockville Center, village (Nassau co.)	1			1			1	1			2
Amityville, village (Suffolk co.)						1					6
Babylon, village (Suffolk co.)	1				2			1			3
Brookhaven, town (Suffolk co.)				1			8			2	24
Greenport, village (Suffolk co.)	1					1					
Huntington, town (Suffolk co.)	4					1	1	5		1	12
Patchogue, village (Suffolk co.)						1	1				9
Sag Harbor, village (Suffolk co.)						1					5
Southold, town (Suffolk co.)	1					2	1	1			1
Rest of county	9			1	2	12	3	4	10	1	132
Dobbs Ferry, village (Westchester co.)	1										3
Greenburgh, town (Westchester co.)							1				4
Hastings-on-Hudson, vil. (West. co.)				2			1				1
Irvington, village (Westchester co.)											4
Mamaroneck, town (Westchester co.)				1		1		2	1	1	6
Mount Vernon (Westchester co.)	4			8	1	5	6			1	22
New Rochelle (Westchester co.)	2			16	4	7	5	2	10	1	13
North Tarrytown, vil. (West. co.)											5
Ossining, village (Westchester co.)	3				1		2	2	1	1	11
Peekskill, village (Westchester co.)				2			2		2		7
Port Chester, vil. (Westchester co.)	1	1			2		4	1	1		5
Rye, town (Westchester co.)							1				3
Tarrytown, village (Westchester co.)	3				1						4
White Plains, vil. (Westchester co.)	2					7	7		1		16
Yonkers (Westchester co.)	7				1	7	20	5	3	6	96
Rest of county	2	4		17	7	19	5	2	3	2	144
Totals for the district	547	22	2	732	[illegible]	347	1 210	309	367	226	9 [illegible]
HUDSON VALLEY DISTRICT:											
Albany (Albany co.)	16			1		17	29	15	6	1	207
Cohoes (Albany co.)	12					1	5			1	42
Green Island, village (Albany co.)				[illegible]			[illegible]				[illegible]
Watervliet (Albany co.)	[illegible]			[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rest of county	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
Hudson (Columbia co.)	[illegible]			[illegible]		[illegible]		[illegible]			[illegible]
Rest of county	[illegible]			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Fishkill, town (Dutchess co.)	[illegible]					[illegible]					[illegible]
Fishkill Landing, vil. (Dutchess co.)	[illegible]				[illegible]			[illegible]			[illegible]
Matteawan, village (Dutchess co.)	[illegible]						[illegible]				[illegible]
Poughkeepsie (Dutchess co.)	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Wappingers Falls, vil. (Dutchess co.)											[illegible]
Rest of county	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Catskill, village (Greene co.)	[illegible]							[illegible]			[illegible]
Coxsackie, town (Greene co.)	[illegible]			[illegible]							[illegible]
Rest of county	[illegible]	[illegible]		[illegible]				[illegible]		[illegible]	[illegible]
Cornwall, village (Orange co.)					[illegible]			[illegible]			[illegible]
Goshen, town (Orange co.)	[illegible]							[illegible]		[illegible]	[illegible]
Middletown (Orange co.)	[illegible]				[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
Montgomery, town (Orange co.)				[illegible]				[illegible]			[illegible]
Newburgh (Orange co.)	[illegible]			[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
Port Jervis (Orange co.)	[illegible]					[illegible]		[illegible]			[illegible]

Total Morta

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system
MARITIME DISTRICT:					
CITY OF NEW YORK:					
BOROUGH OF MANHATTAN	811	2 154	437	1 109	1 505
BOROUGH OF THE BRONX	113	343	85	136	241
BOROUGH OF BROOKLYN	385	1 253	288	618	839
BOROUGH OF QUEENS	56	222	45	92	149
BOROUGH OF RICHMOND	25	100	13	42	50
Totals	1 390	4 072	868	1 997	2 78
Freeport, village (Nassau co.)	2	3	4	4	1
Hempstead, town (Nassau co.)	2	36	6	17	4
North Hempstead, town (Nassau co.)	3	16	4	18	2
Oyster Bay, town (Nassau co.)	5	22	1	5	3
Rockville Center, village (Nassau co.)	3	4	.....	1	
Amityville, village (Suffolk co.)	1	5	1	1	2
Babylon, village (Suffolk co.)	1	1	2	2	
Brookhaven, town (Suffolk co.)	5	10	5	11	3
Greenport, village (Suffolk co.)	1	6	1	2	
Huntington, town (Suffolk co.)	.....	12	1	4	1
Patchogue, village (Suffolk co.)	.....	4	.....	3	
Sag Harbor, village (Suffolk co.)	.....	5	.....	3	
Southold, town (Suffolk co.)	1	5	1	1	1
Rest of county	11	39	14	25	29
Dobbs Ferry, vil. (Westchester co.)	2	3	.....	.....	
Greenburgh, town (Westchester co.)	2	.....	1	2	
Hastings-on-Hudson, vil. (West. co.)	1	3	1	.....	
Irvington, village (Westchester co.)	.....	1	1	1	
Mamaroneck, town (Westchester co.)	7	10	1	4	
Mount Vernon (Westchester co.)	10	28	5	12	
New Rochelle (Westchester co.)	5	17	5	9	
North Tarrytown, village (West. Co.)	.....	1	1	3	
Ossining, village (Westchester co.)	2	10	3	4	
Peekskill, village (Westchester co.)	5	6	.....	5	
Port Chester, village (West. co.)	2	7	5	5	
Rye, town (Westchester co.)	2	3	2	3	
Tarrytown, village (Westchester co.)	.....	5	2	5	
White Plains, village (West. co.)	3	4	5	9	
Yonkers (Westchester co.)	25	40	7	17	
Rest of county	16	98	4	26	
Totals for the district	1 507	4 485	951	2 199	3 6
HUDSON VALLEY DISTRICT:					
Albany (Albany co.)	24	139	24	66	1
Cohoes (Albany co.)	3	26	5	6	
Green Island, village (Albany co.)	2	1	5	1	
Watervliet (Albany co.)	4	12	.....	10	
Rest of county	4	21	2	13	
Hudson (Columbia co.)	2	17	1	6	
Rest of county	3	28	5	10	
Fishkill, town (Dutchess co.)	1	1	3	.....	...
Fishkill Landing, vil. (Dutchess co.)	.....	3	2	4	
Matteawan, village (Dutchess co.)	2	9	.....	9	
Poughkeepsie (Dutchess co.)	6	38	4	20	
Wappingers Falls, vil. (Dutchess co.)	1	2	1	.....	
Rest of county	14	28	9	20	
Catskill, village (Greene co.)	1	5	1	4	
Coxsackie, town (Greene co.)	.....	4	1	2	
Rest of county	2	33	4	5	
Cornwall, village (Orange co.)	.....	1	.....	2	
Goshen, town (Orange co.)	.....	6	.....	5	
Middletown (Orange co.)	5	18	4	6	
Montgomery, town (Orange co.)	.....	1	.....	1	

— (*Continued*)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
MARITIME DISTRICT:											
CITY OF NEW YORK:											
BOROUGH OF MANHATTAN	2 586	551	306	1 984	2 085	411	179	283	1 412	66 249	3 283
BOROUGH OF THE BRONX	405	72	78	255	319	82	19	56	265	13 690	601
BOROUGH OF BROOKLYN	1 710	468	243	723	1 145	185	76	173	762	45 454	2 230
BOROUGH OF QUEENS	286	46	88	156	252	51	9	47	117	8 003	368
BOROUGH OF RICHMOND	180	29	16	61	86	5	3	16	61	2 275	64
Totals	5 167	1 166	676	3 179	3 887	734	286	575	2 617	135 581	6 551
Freeport, village (Nassau co.)	12	2		1	7				4	120	3
Hempstead, town (Nassau co.)	44	6	2	9	18	5	1	2	21	865	34
North Hempstead, town (Nassau co.)	23	4	2	12	39	1	4	2	27	605	30
Oyster Bay, town (Nassau co.)	19	8	2	12	23	4	1	6	14	480	16
Rockville Center, village (Nassau co.)	2	2		1	1			3	4	64	2
Amityville, village (Suffolk co.)	7				10	1			1	36	3
Babylon, village (Suffolk co.)	6	3	3	2	8			1	2	63	4
Brookhaven, town (Suffolk co.)	30	11	3	1	14	4	1	2	8	235	4
Greenport, village (Suffolk co.)	1	2		1	3	1			3	92	3
Huntington, town (Suffolk co.)	13	3	1	5	9	1		6	5	270	9
Patchogue, village (Suffolk co.)	4	1			4				1	45	3
Sag Harbor, village (Suffolk co.)	1				2			2	2	62	2
Southold, town (Suffolk co.)	4	5	1	1	4			1	8	159	0
Rest of county	125	17	9	5	42	11	1	7	28	915	33
Dobbs Ferry, vil. (Westchester co.)	5	1	1	2	6				3	75	5
Greenburgh, town (Westchester co.)	3	8		2	4	1			5	69	3
Hastings-on-Hudson, vil. (West. co.)	6		1	2	5				3	140	1
Irvington, village (Westchester co.)	2				1					38	0
Mamaroneck, town (Westchester co.)	11	6	2	2	8				3	186	9
Mount Vernon (Westchester co.)	52	12	1	11	18	7		4	24	833	30
New Rochelle (Westchester co.)	22	7	3	9	33	6	3		14	749	24
North Tarrytown, vil. (West. co.)	4			4	6				2	198	7
Ossining, village (Westchester co.)	26	6	1	5	14	1	2		23	179	6
Peekskill, village Westchester co.)	19	4	3	7	10	1	2	2	11	302	21
Port Chester, village (West. co.)	9	7	3	3	11	2		1	13	498	27
Rye, town (Westchester co.)	4				6			1	1	57	3
Tarrytown, village (Westchester co.)	20			4	15				3	114	7
White Plains, village (West. co.)	28	2	5	10	16	5	2		12	450	23
Yonkers (Westchester co.)	53	32	15	1	60	8	4	2	89	2 405	118
Rest of county	58	11	4	16	69	4	4	16	29	1 059	87
Totals for the district	5 778	1 321	738	3 307	4 353	797	308	633	2 969	140 944	7 918
HUDSON VALLEY DISTRICT:											
Albany (Albany co.)	171	60	16	76	87	12	9	30	74	1 918	80
Cohoes (Albany co.)	35	13	6	11	24	3		4	23	638	25
Green Island, village (Albany co.)	12	1		2	10				5	69	3
Watervliet (Albany co.)	14	7		14	8			3	7	284	14
Rest of county	28	7	3	9	34	5		11	14	460	16
Hudson (Columbia co.)	26	6			13	4	1	7	12	225	7
Rest of county	66	6	9	3	28	3		23	21	487	12
Fishkill, town (Dutchess co.)	5	1		2	9				1	57	9
Fishkill Landing, vil. (Dutchess co.)	7			1	6			1	4	95	3
Matteawan, village (Dutchess co.)	16	5	2	2	9			1	4	142	5
Poughkeepsie (Dutchess co.)	42	16	4	16	29	2		4	21	703	34
Wappingers Falls, vil. (Dutchess co.)	3			1					3	49	5
Rest of county	51	18	6	10	62	4	1	13	26	645	30
Catskill, village (Greene co.)	7	1	3	4	5			1	1	95	7
Coxsackie, town (Greene co.)	5	1			6	1			2	76	0
Rest of county	33	10	2	10	12	6		7	18	338	11
Cornwall, village (Orange co.)	4	1	1		9		2		2	47	3
Goshen, town (Orange co.)	7		1	1	8			6	6	70	5
Middletown (Orange co.)	30	10		8	21	3	3	6	13	300	15
Montgomery, town (Orange co.)	10	1		1	1				1	52	3

Total Mort

SANITARY DISTRICTS	Population, U. S. census estimate 1912	Total deaths	Deaths under 1 year
HUDSON VALLEY DISTRICT—(*Concl'd*).			
Walden, village (Orange co.)	4 123	53	
Warwick, town (Orange co.)	8 358	103	
Rest of county	44 720	572	
Cold Spring, village (Putnam co.)	2 643	36	
Rest of county	12 276	143	
Hoosick Falls, village (Rensselaer co.)	5 659	79	
Rensselaer (Rensselaer co.)	10 719	152	
Troy (Rensselaer co.)	77 058	1 520	
Rest of county	29 065	416	
Haverstraw, town (Rockland co.)	9 059	89	
Nyack, village (Rockland co.)	4 698	89	
Ramapo, town (Rockland co.)	7 240	108	
Spring Valley, village (Rockland co.)	2 297	33	
Suffern, village (Rockland co)	2 665	56	
Rest of county	22 080	239	
Ellenville, village (Ulster co.)	3 222	60	
Esopus, town (Ulster co.)	4 725	55	
Kingston (Ulster co.)	26 133	481	
Marbletown, town (Ulster co.)	5 499	43	
Rosendale, town (Ulster co.)	3 298	41	
Saugerties, village (Ulster co.)	3 972	54	
Rest of county	47 252	644	
Totals for the district	740 310	12 400	1
ADIRONDACK AND NORTHERN DISTRICT:			
Plattsburg (Clinton co.)	11 602	181	
Rest of county	36 531	438	
Moriah, town (Essex co.)	7 242	86	
Ticonderoga, town (Essex co.)	5 063	71	
Rest of county	20 408	305	
Malone, village (Franklin co.)	6 465	127	
Saranac Lake, village (Franklin co.)	5 502	170	
Tupper Lake, village (Franklin co.)	3 201	37	
Rest of county	31 228	457	
Hamilton county	4 241	49	
Carthage, village (Jefferson co.)	3 633	38	
Clayton, town (Jefferson co.)	4 016	44	
Ellisburg, town (Jefferson co.)	3 613	85	
Watertown (Jefferson co.)	27 388	461	
Rest of county	41 870	589	
Lowville, town (Lewis co.)	3 843	64	
Rest of county	20 240	267	
Canton, town (St. Lawrence co.)	5 985	102	
Gouverneur, town (St. Lawrence co.)	5 892	86	
Massena, village (St. Lawrence co.)	3 134	36	
Ogdensburg (St. Lawrence co.)	16 439	459	
Potsdam, village (St. Lawrence co.)	4 006	74	
Rest of county	52 731	654	
Glens Falls (Warren co.)	15 510	235	
Rest of county	16 901	236	
Fort Edward, town (Washington co.)	5 949	77	
Granville, town (Washington co.)	6 427	85	
Greenwich, town (Washington co.)	4 188	83	
Hudson Falls, village (Washington co.)	5 157	69	
Whitehall, village (Washington co.)	5 263	54	
Rest of county	21 087	331	
Totals for the district	404 755	6 050	

— (*Continued*)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
HUDSON VALLEY DIST.—(Concl'd).											
Walden, village (Orange co.)	1						1				9
Warwick, town (Orange co.)	1					1		1			8
Rest of county	8	2		3		3	3	16	2		50
Cold Spring, village (Putnam co.)		3			1		1				2
Rest of county	1				1			1			10
Hoosick Falls, village (Rensselaer co.)				1				2			8
Rensselaer (Rensselaer co.)	1			2		2	5				17
Troy (Rensselaer co.)	14	1		22	1	5	18	14	9	2	160
Rest of county	7			4	2	1	1	10	2	2	32
Haverstraw, town (Rockland co.)	2						1	1			4
Nyack, village (Rockland co.)								1			7
Ramapo, town (Rockland co.)							1	1			6
Spring Valley, village (Rockland co.)				1	1					1	8
Suffern, village (Rockland co.)				1			1				2
Rest of county	1			2	1	2	1	3		1	20
Ellenville, village (Ulster co.)	1										8
Esopus, town (Ulster co.)						1	1	2			2
Kingston (Ulster co.)	5					7	3	5	2	1	50
Marbletown, town (Ulster co.)											3
Rosendale, town (Ulster co.)	1						1	1	1		2
Saugerties, village (Ulster co.)	2					2		2	1		5
Rest of county	8	3		6		8	3	11	1	2	53
Totals for the district	147	14	...	74	18	77	89	145	35	21	1 136
ADIRONDACK AND NORTHERN DISTRICT:											
Plattsburg (Clinton co.)	3					4	1	1		1	12
Rest of county	2				3	4	1	20	1	2	42
Moriah, town (Essex co.)						1	1				4
Ticonderoga, town (Essex co.)	1						1				7
Rest of county	4					4	2	6		4	27
Malone, village (Franklin co.)	1							4	1	1	8
Saranac Lake, village (Franklin co.)											133
Tupper Lake, village (Franklin co.)								1			3
Rest of county	5			1				14	3		50
Hamilton county								3			4
Carthage, village (Jefferson co.)							1	1			3
Clayton, town (Jefferson co.)											4
Ellisburg, town (Jefferson co.)	2							1			5
Watertown (Jefferson co.)	3				1	2			2	1	17
Rest of county	1			1		1		13	4	2	25
Lowville, town (Lewis co.)											2
Rest of county	1					2		5	2	2	15
Canton, town (St. Lawrence co.)	1					1		1			7
Gouverneur, town (St. Lawrence co.)	1							3			5
Massena, village (St. Lawrence co.)								1			3
Ogdensburg (St. Lawrence co.)	6				1	4		1	1	2	38
Potsdam, village (St. Lawrence co.)								3			2
Rest of county	2					3	5	16		1	48
Glens Falls (Warren co.)	4			1			4	7			16
Rest of county	4							4		1	20
Fort Edward, town (Washington co.)	1							1		1	8
Granville, town (Washington co.)								1			2
Greenwich, town (Washington co.)								6			5
Hudson Falls, village (Washington co.)	1						1	4			2
Whitehall, village (Washington co.)	4							2			3
Rest of county						2		3	2		22
Totals for the district	47	..	.	3	5	28	17	122	16	18	542

Total Mort

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system
HUDSON VALLEY DIST.—(*Concl'd*).					
Newburgh (Orange co.)	6	28	2	16	
Port Jervis (Orange co.)	.....	9	.....	8	
Walden, village (Orange co.)	2	2	.....	.....	
Warwick, town (Orange co.)	1	2	2	5	
Rest of county	8	32	3	17	
Cold Spring, village (Putnam co.)	.....	.....	.....	1	
Rest of county	2	10	2	6	
Hoosick Falls, village (Rensselaer co.)	1	7	.....	3	
Rensselaer (Rensselaer co.)	2	9	3	3	
Troy (Rensselaer co.)	14	86	19	59	1
Rest of county	4	28	7	15	
Haverstraw, town (Rockland co.)	1	7	1	.....	
Nyack, village (Rockland co.)	2	9	1	.....	
Ramapo, town (Rockland co.)	2	3	.....	7	
Spring Valley, village (Rockland co.)	.....	2	.....	.....	
Suffern, village (Rockland co.)	1	3	.....	4	
Rest of county	2	15	4	5	
Ellenville, village (Ulster co.)	.....	5	1	3	
Esopus, town (Ulster co.)	.....	.....	.....	1	
Kingston (Ulster co.)	9	38	2	18	
Marbletown, town (Ulster co.)	.....	1	1	2	
Rosendale, town (Ulster co.)	.....	1	.....	3	
Saugerties, village (Ulster co.)	4	2	2	1	
Rest of county	5	33	3	12	
Totals for the district	140	725	124	379	1
ADIRONDACK AND NORTHERN DISTRICT:					
Plattsburg (Clinton co.)	1	11	2	6	
Rest of county	4	20	1	19	
Moriah, town (Essex co.)	3	5	1	2	
Ticonderoga, town (Essex co.)	.....	3	1	3	
Rest of county	3	23	1	7	
Malone, village (Franklin co.)	2	8	1	4	
Saranac Lake, village (Franklin co.)	.....	7	.....	1	
Tupper Lake, village (Franklin co.)	.....	1	1	1	
Rest of county	4	22	7	22	
Hamilton county	.....	2	1	1	
Carthage, village (Jefferson co.)	.....	3	1	.....	
Clayton, town (Jefferson co.)	1	6	2	4	
Ellisburg, town (Jefferson co.)	.....	3	.....	5	
Watertown (Jefferson co.)	8	29	8	20	
Rest of county	4	37	5	33	
Lowville, town (Lewis co.)	1	5	.....	1	
Rest of county	5	11	1	10	
Canton, town (St. Lawrence co.)	.....	3	....	5	
Gouverneur, town (St. Lawrence co.)	1	10	3	1	
Massena, village (St. Lawrence co.)	.....	2	.....	2	
Ogdensburg (St. Lawrence co.)	7	24	2	10	
Potsdam, village (St. Lawrence co.)	3	4	1	3	
Rest of county	9	39	6	14	
Glens Falls (Warren co.)	2	17	3	11	
Rest of county	5	9	2	8	
Fort Edward, town (Washington co.)	1	.....	1	3	
Granville, town (Washington co.)	1	7	.....	1	
Greenwich, town (Washington co.)	1	5	.....	4	
Hudson Falls, vil. (Washington co.)	...	5	1	4	
Whitehall, village (Washington co.)	..	....	2	4	
Rest of county	4	20	3	11	
Totals for the district	70	341	57	220	

TABLE 20

Total Mortality for the Year 1912

SANITARY DISTRICTS	Population, U. S. census estimate 1912	Total deaths	Ages: Deaths under 1 year	Ages: Deaths 1 to 4 years	Ages: Deaths 5 to 19 years	Ages: Deaths 20 to 39 years	Ages: Deaths 40 to 59 years	Ages: Deaths at 60 years and over
MOHAWK VALLEY DISTRICT:								
Johnstown (Fulton co.)	10 755	123	15	3	4	23	19	59
Gloversville (Fulton co.)	21 576	306	32	14	13	41	77	128
Rest of county	13 285	217	22	6	11	20	37	121
Frankfort, village (Herkimer co.)	3 498	56	17	3	4	4	8	20
Herkimer, village (Herkimer co.)	7 934	110	19	4	2	9	28	48
Ilion, village (Herkimer co.)	6 888	110	11	3	5	19	26	46
Little Falls (Herkimer co.)	12 831	191	44	8	6	42	33	58
Rest of county	26 435	418	48	10	15	39	76	225
Amsterdam (Montgomery co.)	34 645	493	140	37	22	69	87	136
Fort Plain, village (Montgomery co.)	2 837	48	7	1	1	4	13	22
Rest of county	23 643	348	32	7	21	43	56	188
Boonville, town (Oneida co.)	3 213	57	7	2	5	7	8	28
Camden, town (Oneida co.)	3 351	62	7	1	0	8	15	31
Rome (Oneida co.)	21 931	488	74	26	40	84	107	156
Utica (Oneida co.)	79 297	1 503	300	118	63	207	317	498
Whitestown, town (Oneida co.)	8 224	141	43	15	5	11	23	43
Rest of county	44 404	676	75	19	29	55	111	387
Ballston Spa, village (Saratoga co.)	4 136	54	7	4	0	4	5	34
Mechanicville, village (Saratoga co.)	6 976	99	35	5	3	8	20	26
Saratoga Springs, village (Saratoga co.)	12 555	272	23	8	12	45	59	125
Waterford, town (Saratoga co.)	6 198	71	13	4	3	12	5	34
Rest of county	31 869	451	50	14	16	56	72	242
Schenectady (Schenectady co.)	79 444	1 017	241	77	45	161	212	281
Rest of county	16 542	189	26	8	6	34	36	76
Cobleskill, town (Schoharie co.)	3 547	39	5	0	1	4	9	20
Rest of county	19 723	324	27	12	5	23	48	209
Totals for the district	505 737	7 863	1 320	409	337	1 032	1 507	3 241
SOUTHERN TIER DISTRICT:								
Wellsville, village (Allegany co.)	4 393	86	11	2	0	10	24	39
Rest of county	36 261	511	51	8	19	38	83	311
Binghamton (Broome co.)	50 864	908	125	32	42	117	217	371
Lestershire, village (Broome co.)	3 711	76	12	0	5	16	14	26
Rest of county	26 775	433	28	16	11	36	72	267
Olean (Cattaraugus co.)	15 496	215	40	11	10	35	45	73
Salamanca, village (Cattaraugus co.)	5 944	88	14	7	7	13	15	29
Rest of county	44 472	596	56	19	19	41	103	358
Dunkirk (Chautauqua co.)	18 137	227	55	15	11	33	41	72
Fredonia, village (Chautauqua co.)	5 346	65	12	2	4	2	8	36
Jamestown (Chautauqua co.)	33 693	399	59	22	19	58	79	162
Westfield, village (Chautauqua co.)	3 157	50	6	2	2	6	14	20
Rest of county	48 687	696	74	18	24	58	108	414
Elmira (Chemung co.)	37 833	554	52	17	24	71	147	243
Horseheads, town (Chemung co.)	5 612	84	8	4	2	5	10	55
Rest of county	12 159	203	17	2	6	23	34	120
Bath, village (Steuben co.)	3 961	72	3	1	2	4	15	47
Corning (Steuben co.)	13 861	235	31	22	14	44	46	78
Hornell (Steuben co.)	13 830	203	29	7	7	21	39	95
Rest of county	51 931	1 011	67	24	33	81	166	636
Candor, town (Tioga co.)	2 856	43	4	1	0	5	8	25
Owego, village (Tioga co.)	4 540	89	5	1	1	6	18	58
Waverly, village (Tioga co.)	4 841	63	7	3	2	9	11	31
Rest of county	13 000	251	15	7	8	24	35	160
Totals for the district	461 360	7 158	781	243	272	756	1 352	3 726

— (Continued)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
MOHAWK VALLEY DISTRICT:											
Johnstown (Fulton co.)						1		4		1	11
Gloversville (Fulton co.)	3					4	1	2			16
Rest of county	1			1			2	9			13
Frankfort, village (Herkimer co.)	1						1				3
Herkimer, village (Herkimer co.)									1	1	5
Ilion, village (Herkimer co.)							1				3
Little Falls (Herkimer co.)	1				1	1	1	2		1	10
Rest of county	1			1		1	1	4	1	6	35
Amsterdam (Montgomery co.)	4				4	6	5	1	3	1	32
Fort Plain, village (Montgomery co.)									1		2
Rest of county	1						2	9	2	1	24
Boonville, town (Oneida co.)								1		1	4
Camden, town (Oneida co.)								3			4
Rome (Oneida co.)	5					4	1	7	1		63
Utica (Oneida co.)	5			19	2	9	11	11	5	7	97
Whitestown, town (Oneida co.)						1	2	2			8
Rest of county	4			5	2	4	4	8		1	28
Ballston Spa, village (Saratoga co.)	1					1		2			2
Mechanicville, village (Saratoga co.)	1					3					2
Saratoga Springs, vil. (Saratoga co.)	2							5		1	21
Waterford, town (Saratoga co.)	2			1							3
Rest of county	6			2		4	2	9			22
Schenectady (Schenectady co.)	3			13		9	3	7	4	1	89
Rest of county						1		2			18
Cobleskill, town (Schoharie co.)								1		1	2
Rest of county	3					1	2	9	1		15
Totals for the district	44			42	9	50	39	98	19	23	542
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany co.)	1							1			3
Rest of county				2	3	2		19	1		16
Binghamton (Broome co.)	9	2		3	3	12	1	9	2	1	61
Lestershire, village (Broome co.)	1	1					1	3			5
Rest of county	3			2		1	4	4			12
Olean (Cattaraugus co.)						1		1		1	16
Salamanca, village (Cattaraugus co.)							3	1			4
Rest of county	9			1		4	3	10	2	2	21
Dunkirk (Chautauqua co.)	3				1	2	1	2	1		11
Fredonia, village (Chautauqua co.)							3	1			2
Jamestown (Chautauqua co.)	4						1	4		1	22
Westfield, village (Chautauqua co.)				2		1					1
Rest of county	4				1	1	4	14	1	2	28
Elmira (Chemung co.)	6			3		3	7	6		1	24
Horseheads, town (Chemung co.)								1			6
Rest of county	1			1		1		6	1		18
Bath, village (Steuben co.)											3
Corning (Steuben co.)	8			1	1	2		1			15
Hornell (Steuben co.)	1				1			1			5
Rest of county	11				3			13	3		39
Candor, town (Tioga co.)											1
Owego, village (Tioga co.)	1					1		1			3
Waverly, village (Tioga co.)											8
Rest of county	4					1		2	2		6
Totals for the district	66	3		15	13	32	28	100	13	8	330

Total Mort

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system
MOHAWK VALLEY DISTRICT:					
Johnstown (Fulton co.)............	4	8	3	2	
Gloversville (Fulton co.)............	3	19	3	13	
Rest of county....................	4	11	1	11	
Frankfort, village (Herkimer co.).....	....	2	....	2	
Herkimer, village (Herkimer co.).....	1	11	1	1	
Ilion, village (Herkimer co.)..........	1	6	2	4	
Little Falls (Herkimer co.)...........	2	10	2	7	
Rest of county....................	3	18	5	16	
Amsterdam (Montgomery co.)........	4	24	7	18	
Fort Plain, village (Montgomery co.).	2	1	1	1	
Rest of county....................	2	26	9	9	
Boonville, town (Oneida co.).........	1	4	....	3	
Camden, town (Oneida co.)..........	3	8	2	3	
Rome (Oneida co.)..................	12	15	6	6	
Utica (Oneida co.)..................	36	82	17	61	
Whitestown town (Oneida co.).......	....	7	1	7	
Rest of county....................	3	49	11	22	
Ballston Spa, village (Saratoga co.) ..	....	3	....	1	
Mechanicville, village (Saratoga co.).	2	3	2	1	
Saratoga Springs, vil. (Saratoga co.)	6	18	3	10	
Waterford, town (Saratoga co.)......	2	3	1	....	
Rest of county....................	2	22	6	15	
Schenectady (Schenectady co.)......	13	61	17	41	
Rest of county....................	1	11	2	5	
Cobleskill, town (Schoharie co.)......	....	1	....	1	
Rest of county....................	5	25	6	8	
Totals for the district..........	112	448	108	268	
SOUTHERN TIER DISTRICT:					
Wellsville, village (Allegany co.).....	....	7	1	3	
Rest of county	3	41	9	19	
Binghamton (Broome co.)..........	10	53	10	35	
Lestershire, village (Broome co.)......	1	9	....	3	
Rest of county....	5	30	7	18	
Olean (Cattaraugus co.)............	2	11	1	7	
Salamanca, village (Cattaraugus co.).	2	5	....	3	
Rest of county....................	2	47	8	23	
Dunkirk (Chautauqua co.)..........	5	11	....	6	
Fredonia, village (Chautauqua co.)...	....	4	....	1	
Jamestown (Chautauqua co.)........	7	29	9	14	
Westfield, village (Chautauqua co.).	1	2	1	1	
Rest of county....................	4	51	10	16	
Elmira (Chemung co.)	5	39	17	26	
Horseheads, town (Chemung co.)....	1	7	1	2	
Rest of county....................	2	17	....	4	
Bath, village (Steuben co.)..........	....	4	1	2	
Corning (Steuben co.)......	1	13	6	25	
Hornell (Steuben co.)..............	5	18	2	13	
Rest of county	5	51	15	34	
Candor, town (Tioga co.)...........	....	3	2	3	
Owego, village (Tioga co.)	2	6	1	3	
Waverly, village (Tioga co.).........	1	3	1	1	
Rest of county....................	4	13	1	8	
Totals for the district..........	68	474	103	270	

— (*Continued*)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	Births: Total births	Births: Still births
MOHAWK VALLEY DISTRICT:											
Johnstown (Fulton co.)	7	4	2	2	1	1	....	1	7	161	5
Gloversville (Fulton co.)	26	13	1	3	18	2	....	8	16	383	18
Rest of county	27	3	1	4	10	2	....	8	6	242	9
Frankfort, village (Herkimer co.)	4	2	1	5	3	....	....	3	2	116	2
Herkimer, village (Herkimer co.)	7	3	1	4	12	....	....	3	3	215	5
Ilion, village (Herkimer co.)	19	4	1	1	10	2	1	1	7	119	5
Little Falls (Herkimer co.)	12	4	1	8	21	2	1	4	16	391	8
Rest of county	44	8	1	7	36	....	1	18	26	478	21
Amsterdam (Montgomery co.)	47	7	5	14	32	7	....	4	25	775	29
Fort Plain, village (Montgomery co.)	5	1	....	....	5	....	....	1	4	43	1
Rest of county	26	8	8	6	34	5	....	12	10	387	13
Boonville, town (Oneida co.)	1	3	....	1	3	2	....	2	4	50	4
Camden, town (Oneida co.)	3	2	....	1	6	1	....	....	2	48	2
Rome (Oneida co.)	43	8	3	13	26	2	1	6	11	548	18
Utica (Oneida co.)	100	37	16	31	75	7	....	15	69	2 101	84
Whitestown, town (Oneida co.)	6	2	1	6	5	....	....	....	11	221	11
Rest of county	61	16	4	8	42	10	....	14	24	813	16
Ballston Spa, village (Saratoga co.)	9	....	....	....	4	2	....	....	2	81	2
Mechanicville, village (Saratoga co.)	2	2	1	2	13	1	....	....	8	225	6
Saratoga Springs, vil. (Saratoga co.)	41	5	2	3	16	....	....	2	8	217	13
Waterford, town (Saratoga co.)	7	2	1	2	7	1	1	4	1	88	2
Rest of county	47	12	2	7	30	4	....	16	19	467	20
Schenectady (Schenectady co.)	65	20	15	20	47	16	2	6	74	1 829	55
Rest of county	10	4	2	2	31	7	....	6	13	263	9
Cobleskill, town (Schoharie co.)	3	3	....	1	3	1	....	1	....	36	1
Rest of county	29	9	3	11	12	2	....	14	7	310	15
Totals for the district	651	182	67	162	502	78	7	149	375	10 607	374
SOUTHERN TIER DISTRICT:											
Wellsville, village (Allegany co.)	13	2	1	3	4	1	....	....	4	72	3
Rest of county	41	10	4	8	25	6	....	19	23	608	28
Binghamton (Broome co.)	72	22	4	16	45	11	2	13	44	1 091	48
Lestershire, village (Broome co.)	3	7	3	2	1	....	....	....	4	88	3
Rest of county	29	12	5	7	32	7	....	22	12	465	18
Olean (Cattaraugus co.)	10	3	2	12	19	5	1	....	16	378	17
Salamanca, village (Cattaraugus co.)	6	....	....	3	14	2	....	2	5	142	6
Rest of county	47	12	8	6	24	7	1	12	24	767	36
Dunkirk (Chautauqua co.)	13	3	2	7	22	1	....	....	18	504	18
Fredonia, village (Chautauqua co.)	1	....	....	2	3	....	1	....	5	116	7
Jamestown (Chautauqua co.)	37	17	6	9	19	4	....	7	28	750	25
Westfield, village (Chautauqua co.)	2	....	1	....	....	2	....	2	3	53	1
Rest of county	50	7	9	12	38	11	....	34	32	875	38
Elmira (Chemung co.)	74	19	5	8	30	2	2	1	16	607	39
Horseheads, town (Chemung co.)	8	3	1	1	6	3	....	5	5	110	6
Rest of county	15	6	4	5	11	2	....	5	5	170	4
Bath, village (Steuben co.)	16	4	1	1	4	1	....	3	2	36	0
Corning (Steuben co.)	26	4	6	6	20	3	....	6	13	260	8
Hornell (Steuben co.)	10	5	4	4	16	2	....	5	7	228	10
Rest of county	95	30	3	12	85	5	1	27	43	756	24
Candor, town (Tioga co.)	5	1	....	....	2	2	....	2	3	49	0
Owego, village (Tioga co.)	7	....	....	1	3	1	....	4	2	61	3
Waverly, village (Tioga co.)	11	3	....	....	2	1	....	1	6	59	1
Rest of county	21	6	3	2	18	4	....	13	4	225	11
Totals for the district	612	176	72	127	443	83	8	183	329	8 503	354

TABLE 20

Total Mortality for the Year 1912

SANITARY DISTRICTS	Population, U. S. census estimate 1912	Total deaths	AGES: Deaths under 1 year	Deaths 1 to 4 years	Deaths 5 to 19 years	Deaths 20 to 39 years	Deaths 40 to 59 years	Deaths at 60 years and over
EAST CENTRAL DISTRICT:								
Norwich, village (Chenango co.)	7 558	128	16	9	2	11	30	60
Rest of county	27 465	511	38	6	12	35	103	316
Cortland (Cortland co.)	11 643	205	17	6	12	25	54	91
Homer, village (Cortland co.)	2 765	44	2	0	0	4	6	32
Rest of county	14 786	256	18	10	9	10	41	167
Sidney, town (Delaware co.)	4 110	59	7	1	2	3	11	35
Walton, town (Delaware co.)	5 152	71	10	3	0	8	18	32
Rest of county	35 884	500	69	13	14	46	88	270
Canastota, village (Madison co.)	3 247	70	16	4	5	7	9	27
Cazenovia, town (Madison co.)	3 755	52	4	0	1	6	7	34
Hamilton, town (Madison co.)	3 931	63	4	0	1	5	10	43
Oneida (Madison co.)	8 312	122	12	5	7	13	35	50
Rest of county	19 964	346	31	14	8	17	54	218
Baldwinsville, village (Onondaga co.)	3 160	51	3	1	3	3	12	29
DeWitt, town (Onondaga co.)	4 489	78	11	5	5	12	18	27
East Syracuse, village (Onondaga co.)	3 399	40	6	3	0	7	9	15
Solvay, village (Onondaga co.)	5 565	74	31	5	5	11	9	13
Syracuse (Onondaga co.)	146 133	2 177	411	109	107	327	494	729
Rest of county	47 567	823	83	16	37	77	134	475
Cooperstown, village (Otsego co.)	2 497	45	4	0	3	3	10	25
Oneonta (Otsego co.)	10 141	162	26	7	13	28	34	54
Worcester, town (Otsego co.)	2 153	43	2	0	0	2	4	35
Rest of county	32 090	579	51	9	17	36	101	363
Liberty, town (Sullivan co.)	5 371	167	9	1	6	87	33	31
Rest of county	28 060	407	38	11	9	58	76	214
Totals for the district	439 197	7 073	919	238	278	841	1 400	3 385
WEST CENTRAL DISTRICT:								
Auburn (Cayuga co.)	35 637	571	91	35	18	82	130	215
Rest of county	31 812	537	47	15	19	42	67	346
Batavia, village (Genesee co.)	12 246	224	39	18	13	25	43	86
Le Roy, village (Genesee co.)	3 941	56	4	3	5	6	10	28
Rest of county	22 225	256	34	12	6	17	37	149
Dansville, village (Livingston co.)	3 951	63	5	2	2	6	11	37
Mt. Morris, village (Livingston co.)	2 859	52	15	9	1	4	9	14
Rest of county	31 556	558	41	20	45	110	94	247
Canandaigua, village (Ontario co.)	7 186	177	20	13	5	24	32	83
Geneva (Ontario co.)	12 574	213	29	10	11	29	43	89
Manchester, town (Ontario co.)	4 939	93	5	3	4	15	21	45
Phelps, town (Ontario co.)	4 733	57	7	1	1	3	9	35
Rest of county	22 829	274	26	13	8	24	35	168
Hector, town (Schuyler co.)	3 358	56	2	1	1	6	9	37
Rest of county	10 185	215	12	6	7	12	37	141
Seneca Falls, village (Seneca co.)	6 553	102	13	1	7	9	18	54
Waterloo, village (Seneca co.)	3 883	76	5	0	0	8	15	48
Rest of county	16 390	357	20	10	8	31	82	206
Ithaca (Tompkins co.)	14 940	231	16	7	6	32	44	126
Rest of county	18 561	323	28	4	10	15	51	214
Perry, village (Wyoming co.)	4 677	43	9	1	4	4	4	21
Warsaw, town (Wyoming co.)	4 273	74	7	3	1	7	15	41
Rest of county	23 244	302	25	9	8	24	39	197
Penn Yan, village (Yates co.)	4 638	84	3	2	2	5	19	53
Rest of county	13 708	188	21	8	5	5	29	120
Totals for the district	320 898	5 182	524	206	197	545	903	2 800

— (*Continued*)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Epidemic Diseases: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango co.)	2				1			1	1		4
Rest of county	5					2		17		2	26
Cortland (Cortland co.)	3					1	1	2	1		11
Homer, village (Cortland co.)	1							1			2
Rest of county	2			1	1		4	5			13
Sidney, town (Delaware co.)								2			2
Walton, town (Delaware co.)	1						1	2	3		3
Rest of county	3		2	1		3		11	2		23
Canastota, village (Madison co.)							5				4
Cazenovia, town (Madison co.)											2
Hamilton, town (Madison co.)				1							1
Oneida (Madison co.)	1						4				8
Rest of county	2				3	2		10	2	3	11
Baldwinsville, village (Onondaga co.)								1			3
DeWitt, town (Onondaga co.)				1		1	1				8
East Syracuse, village (Onondaga co.)						1					1
Solvay, village (Onondaga co.)	2				1	2	1	1			6
Syracuse (Onondaga co.)	21	1		6	10	16	25	12	5	2	129
Rest of county	2				2	7	7	8	3		57
Cooperstown, village (Otsego co.)	1						2				1
Oneonta (Otsego co.)	2	1					1				7
Worcester, town (Otsego co.)	1							6			
Rest of county	5				1	1	1	11	1		32
Liberty, town (Sullivan co.)	2										110
Rest of county	4					1	1	7			54
Totals for the district	63	2	2	10	19	37	54	97	18	7	518
WEST CENTRAL DISTRICT:											
Auburn (Cayuga co.)	4			1		5	2	3			31
Rest of county	6			1	3	2	4	9	3	1	22
Batavia, village (Genesee co.)	4			4	3		12	8	1		11
Le Roy, village (Genesee co.)						3					5
Rest of county	2							6			7
Dansville, village (Livingston co.)						1					6
Mt. Morris, village (Livingston co.)		1				1	1		1		4
Rest of county	15			2	1	2	1	4	3	2	48
Canandaigua, village (Ontario co.)	3			1	1	2		2	1		9
Geneva (Ontario co.)	4			5	1			4			5
Manchester, town (Ontario co.)	1			1				2		1	6
Phelps, town (Ontario co.)	1										2
Rest of county	2			1		1	2	8	1		16
Hector, town (Schuyler co.)	2							1			3
Rest of county	3			1			1	2			11
Seneca Falls, village (Seneca co.)				1				2		1	8
Waterloo, village (Seneca co.)	1							1			2
Rest of county	2			1	1	1	2	7			39
Ithaca (Tompkins co.)	3					1	1	3	1		10
Rest of county						1		15	2	1	12
Perry, village (Wyoming co.)	1					1	1	2			1
Warsaw, town (Wyoming co.)						1		1			4
Rest of county	3							7			13
Penn Yan, village (Yates co.)				2							2
Rest of county				1		1		11			7
Totals for the district	57	1		22	10	23	27	98	13	6	284

Total Mort

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system
EAST CENTRAL DISTRICT:					
Norwich, village (Chenango co.)	1	12	2	2	
Rest of county	6	40	8	11	
Cortland (Cortland co.)	2	20	2	11	
Homer, village (Cortland co.)	1	....	2	2	
Rest of county	6	11	9	12	
Sidney, town (Delaware co.)	....	3	....	1	
Walton, town (Delaware co.)	1	4	....	2	
Rest of county	4	38	7	17	
Canastota, village (Madison co.)	1	3	1	1	
Casenovia, town (Madison co.)	....	5	1	5	
Hamilton, town (Madison co.)	....	8	2	4	
Oneida (Madison co.)	....	12	....	5	
Rest of county	2	12	4	13	
Baldwinsville, village (Onondaga co.)	1	6	....	1	
DeWitt, town (Onondaga co.)	1	2	....	1	
East Syracuse, village (Onondaga co.)	1	2	2	1	
Solvay, village (Onondaga co.)	2	2	....	1	
Syracuse (Onondaga co.)	31	146	33	79	
Rest of county	6	59	6	26	
Cooperstown, village (Otsego co.)	....	4	....	2	
Oneonta (Otsego co.)	1	16	5	6	
Worcester, town (Otsego co.)	....	5	....	3	
Rest of county	2	36	7	21	
Liberty, town (Sullivan co.)	2	8	2	2	
Rest of county	2	28	6	15	
Totals for the district	73	482	99	244	
WEST CENTRAL DISTRICT:					
Auburn (Cayuga co.)	8	38	5	25	
Rest of county	6	35	3	14	
Batavia, village (Genesee co.)	1	9	4	8	
Le Roy, village (Genesee co.)	....	2	....	3	
Rest of county	3	13	2	8	
Dansville, village (Livingston co.)	2	3	....	2	
Mt. Morris, village (Livingston co.)	2	3	....	2	
Rest of county	7	38	....	12	
Canandaigua, village (Ontario co.)	2	14	3	5	
Geneva (Ontario co.)	4	9	3	4	
Manchester, town (Ontario co.)	....	8	....	5	
Phelps, town (Ontario co.)	....	4	1	2	
Rest of county	2	16	1	5	
Hector, town (Schuyler co.)	1	6	2	1	
Rest of county	1	13	2	6	
Seneca Falls, village (Seneca co.)	1	5	1	5	
Waterloo, village (Seneca co.)	2	7	....	4	
Rest of county	1	24	6	7	
Ithaca (Tompkins co.)	3	10	2	8	
Rest of county	5	22	....	14	
Perry, village (Wyoming co.)	....	....	2	....	
Warsaw, town (Wyoming co.)	....	7	3	3	
Rest of county	6	21	3	19	
Penn Yan, village (Yates co.)	1	5	2	6	
Rest of county	....	9	2	3	
Totals for the district	58	321	47	171	

— (*Continued*)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
EAST CENTRAL DISTRICT:											
Norwich, village (Chenango co.)	16	7	....	3	5	3	....	1	3	154	7
Rest of county	53	12	3	7	25	5	....	7	17	446	18
Cortland (Cortland co.)	22	5	4	5	6	1	....	9	7	238	12
Homer, village (Cortland co.)	2	....	....	1	....	1	....	3	2	35	0
Rest of county	32	10	....	1	7	5	....	3	12	252	12
Sidney, town (Delaware co.)	5	4	1	1	5	1	....	2	4	53	3
Walton, town (Delaware co.)	10	2	1	3	5	....	....	2	6	100	0
Rest of county	34	10	7	10	24	4	2	18	25	674	3
Canastota, village (Madison co.)	1	1	....	5	8	....	....	5	4	95	2
Casenovia, town (Madison co.)	2	....	....	1	....	....	....	3	2	56	2
Hamilton, town (Madison co.)	2	4	....	1	1	2	....	1	2	57	1
Oneida (Madison co.)	6	6	....	1	8	1	....	2	7	154	2
Rest of county	25	13	3	7	21	3	....	17	9	361	15
Baldwinsville, village (Onondaga co.)	7	2	....	....	6	1	....	1	2	52	2
DeWitt, town (Onondaga co.)	4	2	1	4	10	2	1	2	2	52	4
East Syracuse, village (Onondaga co.)	1	....	....	1	3	....	....	....	....	84	3
Solvay, village (Onondaga co.)	1	....	....	4	5	1	1	1	9	155	8
Syracuse (Onondaga co.)	163	62	23	61	146	26	1	20	121	3 065	134
Rest of county	70	19	2	12	55	8	....	20	35	814	43
Cooperstown, village (Otsego co.)	5	1	....	1	3	....	....	....	3	47	1
Oneonta (Otsego co.)	6	5	....	3	20	1	2	2	14	214	4
Worcester, town (Otsego co.)	5	....	....	....	1	....	....	2	....	30	0
Rest of county	54	18	7	9	26	4	....	19	25	499	17
Liberty, town (Sullivan co.)	4	3	....	2	2	....	....	....	2	76	4
Rest of county	23	10	3	6	20	2	1	15	10	492	14
Totals for the district	553	196	55	149	412	71	8	15[illegible]	323	8 255	311
WEST CENTRAL DISTRICT:											
Auburn (Cayuga co.)	45	7	4	16	37	6	2	16	21	715	27
Rest of county	46	11	3	10	45	5	....	14	19	481	16
Batavia, village (Genesee co.)	10	6	2	5	16	1	2	7	14	309	14
Le Roy, village (Genesee co.)	....	4	1	....	7	....	....	1	1	88	0
Rest of county	19	3	2	2	22	1	1	10	19	398	10
Dansville, village (Livingston co.)	4	....	1	1	1	1	....	1	3	48	0
Mt. Morris, village (Livingston co.)	2	....	....	1	2	1	....	1	4	117	1
Rest of county	42	8	1	7	25	5	2	13	14	488	14
Canandaigua, village (Ontario co.)	16	4	3	1	16	1	....	5	9	169	7
Geneva (Ontario co.)	19	7	1	1	19	1	1	7	11	246	11
Manchester, town (Ontario co.)	11	3	1	....	4	1	....	1	1	97	5
Phelps, town (Ontario co.)	10	....	....	....	3	1	....	1	5	78	2
Rest of county	24	4	2	8	18	4	....	6	6	349	9
Hector, town (Schuyler co.)	7	....	....	....	4	1	....	2	1	62	0
Rest of county	14	8	2	3	7	3	....	8	11	172	11
Seneca Falls, village (Seneca co.)	6	3	....	2	2	1	....	2	4	149	9
Waterloo, village (Seneca co.)	7	....	....	....	5	1	1	5	2	55	2
Rest of county	24	7	2	4	10	4	2	6	8	225	13
Ithaca (Tompkins co.)	30	10	3	2	12	1	....	7	14	252	11
Rest of county	41	12	....	5	9	2	....	8	17	302	10
Perry, village (Wyoming co.)	2	3	1	2	1	....	....	2	4	106	4
Warsaw, town (Wyoming co.)	4	2	1	2	4	....	....	3	2	52	1
Rest of county	17	9	2	4	17	2	1	17	10	419	8
Penn Yan, village (Yates co.)	3	1	1	....	6	1	....	6	1	63	6
Rest of county	13	2	1	2	11	2	....	7	12	229	10
Totals for the district	176	114	34	78	303	46	12	156	213	5 669	201

Total Mc

SANITARY DISTRICTS	Population, U. S. census estimate 1912	Total deaths
ONTARIO AND WESTERN DISTRICT:		
Amherst, town (Erie co.)	4 693	
Buffalo (Erie co.)	444 915	6 5
Depew, village (Erie co.)	4 095	
East Aurora, village (Erie co.)	2 981	
Lackawanna (Erie co.)	16 011	4
Lancaster, village (Erie co.)	4 594	
Tonawanda (Erie co.)	8 464	
West Seneca, town (Erie co.)	5 068	
Rest of county	63 153	
Brockport, village (Monroe co.)	3 568	
Fairport, village (Monroe co.)	3 343	
Rochester (Monroe co.)	234 514	3
Rest of county	61 589	
Lockport (Niagara co.)	18 215	
Niagara Falls (Niagara co.)	32 263	
North Tonawanda (Niagara co.)	12 779	
Rest of county	32 237	
Albion, village (Orleans co.)	4 978	
Medina, village (Orleans co.)	5 940	
Rest of county	21 386	
Fulton (Oswego co.)	11 230	
Oswego (Oswego co.)	23 814	
Richland, town (Oswego co.)	3 880	
Rest of county	33 593	
Clyde, village (Wayne co.)	2 759	
Lyons, village (Wayne co.)	4 379	
Newark, village (Wayne co.)	6 733	
Palmyra, town (Wayne co.)	4 235	
Rest of county	32 710	
Totals for the district	1 108 069	
Totals for the State	*9 592 258*	*1*

— (*Continued*)

in the Sanitary Districts — (Continued)

SANITARY DISTRICTS	EPIDEMIC DISEASES: Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	Pulmonary tuberculosis
ONTARIO AND WESTERN DISTRICT:											
Amherst, town (Erie co.)	2					1	1	2			4
Buffalo (Erie co.)	50			68	22	28	61	9	18	3	520
Depew, village (Erie co.)				2			1		1		11
East Aurora, village (Erie co.)											1
Lackawanna (Erie co.)	1			26	1	11	1	1	1	1	18
Lancaster, village (Erie co.)								1			6
Tonawanda (Erie co.)	2						1	2		1	15
West Seneca, town (Erie co.)					1			3		1	5
Rest of county	6	2		1	1	7	3	8			40
Brockport, village (Monroe co.)				1							1
Fairport, village (Monroe co.)							1				1
Rochester (Monroe co.)	27			31	28	14	62	16	18	7	217
Rest of county	4			4	6	4	5	11	3	1	117
Lockport (Niagara co.)	3			2		5		1		2	21
Niagara Falls (Niagara co.)	23			4	7	2	8	3	1	2	36
North Tonawanda (Niagara co.)	3					1	1	2	1		4
Rest of county	5				1	3	1	8	2	1	13
Albion, village (Orleans co.)				2		3	1	2			7
Medina, village (Orleans co.)											4
Rest of county	1			3	3	3	2	3			22
Fulton (Oswego co.)	2						1			1	14
Oswego (Oswego co.)	5			1		3	1	2	2		30
Richland, town (Oswego co.)	1							1			1
Rest of county	1			2	1	2	3	8	1		22
Clyde, village (Wayne co.)	2			2			1				2
Lyons, village (Wayne co.)								1			3
Newark, village (Wayne co.)	1				1		3		1		5
Palmyra, town (Wayne co.)				2							5
Rest of county	5			1	1	2	2	10	2	4	17
Totals for the district	144	2		152	73	89	160	94	51	24	1 171
Totals for the State	*1 198*	*54*	*4*	*1 060*	*789*	*685*	*1 614*	*1 067*	*539*	*333*	*13 716*

Total Mortal

SANITARY DISTRICTS	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system
ONTARIO AND WESTERN DISTRICT:					
Amherst, town (Erie co.)	.....	5	.....	1	12
Buffalo (Erie co.)	96	409	69	283	580
Depew, village (Erie co.)	.....	1	.....	.....	3
East Aurora, village (Erie co.)	.....	2	.....	.....	6
Lackawanna (Erie co.)	7	3	.....	31	8
Lancaster, village (Erie co.)	.....	2	1	1	6
Tonawanda (Erie co.)	4	3	1	2	10
West Seneca, town (Erie co.)	.....	5	2	3	9
Rest of county	10	56	8	28	112
Brockport, village (Monroe co.)	1	3	1	1	8
Fairport, village (Monroe co.)	.....	2	1	.....	14
Rochester (Monroe co.)	49	223	57	85	318
Rest of county	4	42	11	20	76
Lockport (Niagara co.)	4	16	2	9	29
Niagara Falls (Niagara co.)	11	17	2	17	39
North Tonawanda (Niagara co.)	2	5	.....	5	23
Rest of county	5	30	6	17	56
Albion, village (Orleans co.)	4	3	.....	8	17
Medina, village (Orleans co.)	1	5	4	6	7
Rest of county	5	20	1	15	28
Fulton (Oswego co.)	2	7	3	12	15
Oswego (Oswego co.)	2	21	6	13	48
Richland, town (Oswego co.)	2	3	2	7	10
Rest of county	7	43	4	22	87
Clyde, village (Wayne co.)	1	4	.....	2	5
Lyons, village (Wayne co.)	3	4	2	1	2
Newark, village (Wayne co.)	.....	5	.....	5	13
Palmyra, town (Wayne co.)	1	4	.....	3	7
Rest of county	4	31	6	12	50
Totals for the district	225	974	189	609	1 598
Totals for the State	*2 253*	*8 250*	*1 678*	*4 360*	*10 993*

— (*Concluded*)

in the Sanitary Districts — (Concluded)

SANITARY DISTRICTS	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
LAKE ONTARIO AND WESTERN DISTRICT:											
Amherst, town (Erie co.)	2	1	....	....	1	1	....	5	4	92	1
Buffalo (Erie co.)	353	177	62	57	342	47	21	114	520	11 591	517
Depew, village (Erie co.)	2	....	1	3	7	1	....	....	6	189	1
East Aurora, village (Erie co.)	3	....	....	1	1	....	....	....	1	55	2
Lackawanna (Erie co.)	5	....	2	28	24	1	2	2	29	556	19
Lancaster, village (Erie co.)	10	....	....	....	2	....	2	....	6	95	3
Tonawanda (Erie co.)	3	....	....	1	9	3	....	3	5	156	4
West Seneca, town (Erie co.)	5	4	....	2	4	....	....	7	3	100	0
Rest of county	52	12	5	23	106	9	2	19	31	1 162	39
Brockport, village (Monroe co.)	6	....	....	....	3	....	....	5	1	61	5
Fairport, village (Monroe co.)	3	1	2	....	1	....	....	4	4	60	4
Rochester (Monroe co.)	287	98	33	19	200	31	9	8	181	5 524	255
Rest of county	52	5	12	15	77	10	8	25	46	1 146	34
Lockport (Niagara co.)	18	3	4	4	23	3	1	7	12	316	9
Niagara Falls (Niagara co.)	27	11	6	12	60	9	3	5	36	1 132	48
North Tonawanda (Niagara co.)	6	3	....	5	10	2	....	5	11	377	13
Rest of county	38	12	3	8	22	2	....	17	13	554	14
Albion, village (Orleans co.)	5	....	1	3	4	....	....	2	3	91	3
Medina, village (Orleans co.)	14	2	....	1	5	1	....	1	6	114	8
Rest of county	32	5	3	4	13	4	....	9	8	436	17
Fulton (Oswego co.)	18	6	3	8	13	1	1	6	16	291	16
Oswego (Oswego co.)	31	7	4	7	25	2	1	4	24	457	29
Richland, town (Oswego co.)	5	2	....	1	5	2	....	....	3	56	5
Rest of county	52	20	6	14	26	1	....	11	27	608	23
Clyde, village (Wayne co.)	5	2	....	....	3	....	....	2	1	60	3
Lyons, village (Wayne co.)	7	....	1	4	11	....	....	3	5	108	4
Newark, village (Wayne co.)	6	4	....	3	12	1	1	1	....	132	1
Palmyra, town (Wayne co.)	2	1	....	2	5	....	....	2	5	70	4
Rest of county	41	10	3	9	29	5	1	30	23	644	27
Totals for the district	1 090	386	151	234	1 043	136	52	297	1 030	26 233	1 108
Totals for the State	*10613*	*2 816*	*1 256*	*4 452*	*8 130*	*1 340*	*434*	*1 992*	*5 980*	*227 120*	*10250*

TABLE 21 —

CITIES	Population U. S. census estimate 1912	Total deaths	Annual death rate per 1,000 population	Deaths under 1 year
First-class cities, over 175,000	*5,793,519*	*82,917*	*14.3*	*16,25*
City of New York	*5,114,090*	*73,019*	*14.3*	*14,26*
BOROUGH OF MANHATTAN	2,435,102	36,559	15.0	7,6
BOROUGH OF THE BRONX	503,181	6,944	13.8	1,1
BOROUGH OF BROOKLYN	1,760,848	23,994	13.6	4,4
BOROUGH OF QUEENS	323,089	3,978	12.3	7
BOROUGH OF RICHMOND	91,870	1,544	16.8	[illegible]
Buffalo	444,915	6,527	14.7	1,
Rochester	234,514	3,371	14.4	
Second-class cities, 50,000 to 175,000	*622,397*	*10,254*	*16.5*	*1,*
Syracuse	146,133	2,177	14.9	
Albany	101,469	2,046	20.2	
Yonkers	88,132	1,083	12.3	
Schenectady	79,444	1,017	12.8	
Utica	79,297	1,503	19.0	
Troy	77,058	1,520	19.7	
Binghamton	50,864	908	17.9	
Third-class cities, 20,000 to 50,000	*443,928*	*6,908*	*15.6*	*1,*
Elmira	37,833	554	14.6	
Auburn	35,637	571	16.0	
Amsterdam	34,645	493	14.2	[illegible]
Jamestown	33,693	399	11.8	
Mt. Vernon	33,631	401	11.9	
New Rochelle	32,707	379	11.6	
Niagara Falls	32,263	544	16.9	14
Poughkeepsie	29,199	489	16.7	7
Newburgh	28,478	519	18.2	6
Watertown	27,388	461	16.8	6
Kingston	26,138	481	18.4	5
Cohoes	25,000	440	17.6	90
Oswego	23,814	383	16.1	67
Rome	21,931	488	22.3	74
Gloversville	21,576	306	14.2	32
Third-class cities, 10,000 to 20,000	*374,381*	*6,263*	*16.7*	*1,186*
Lockport	18,215	291	16.0	32
Dunkirk	18,137	227	12.5	[illegible]
White Plains, village	17,892	256	[illegible]	[illegible]
Ogdensburg	16,439	459	[illegible]	[illegible]
Peekskill, village	16,170	191	[illegible]	[illegible]
Lackawanna	16,011	410	[illegible]	[illegible]
Glens Falls	15,510	235	[illegible]	[illegible]
Olean	15,496	215	[illegible]	[illegible]
Watervliet	15,341	269	[illegible]	[illegible]
Middletown	15,147	374	[illegible]	[illegible]
Ithaca	14,940	231	[illegible]	[illegible]
Corning	13,861	235	[illegible]	[illegible]
Hornell	13,830	203	[illegible]	[illegible]
Port Chester, village	13,537	196	[illegible]	[illegible]
Ossining, village	12,886	200	[illegible]	[illegible]
Little Falls	12,831	191	[illegible]	[illegible]
North Tonawanda	12,779	136	[illegible]	[illegible]
Geneva	12,574	213	[illegible]	[illegible]
Saratoga Springs, village	12,555	272	[illegible]	[illegible]
Batavia, village	12,246	224	[illegible]	[illegible]
Hudson	11,894	211	[illegible]	[illegible]
Cortland	11,643	[illegible]	[illegible]	[illegible]

Total

CITIES	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system
First-class cities, over 175,000	*1,535*	*4,704*	*994*	*2,365*	*3,68*[illegible]
City of New York	*1,390*	*4,072*	*868*	*1,997*	*2,78*[illegible]
BOROUGH OF MANHATTAN	811	2,154	437	1,109	1,50[illegible]
BOROUGH OF THE BRONX	113	343	85	136	24[illegible]
BOROUGH OF BROOKLYN	385	1,253	288	618	83[illegible]
BOROUGH OF QUEENS	56	222	45	92	14[illegible]
BOROUGH OF RICHMOND	25	100	13	42	5[illegible]
Buffalo	96	409	69	283	58[illegible]
Rochester	49	223	57	85	31[illegible]
Second-class cities, 50,000 to 175,000	*153*	*616*	*127*	*35*[illegible]	*97*[illegible]
Syracuse	31	146	33	79	21[illegible]
Albany	24	139	24	66	18
Yonkers	25	49	7	17	8
Schenectady	13	61	17	41	10
Utica	36	82	17	61	13
Troy	14	86	19	59	12
Binghamton	10	53	10	35	11
Third-class cities, 20,000 to 50,000	*99*	*406*	*86*	*233*	*75*
Elmira	5	39	17	26	[illegible]
Auburn	8	38	5	25	[illegible]
Amsterdam	4	24	7	18	[illegible]
Jamestown	7	29	9	14	[illegible]
Mt. Vernon	10	28	5	12	[illegible]
New Rochelle	5	17	5	9	[illegible]
Niagara Falls	11	17	2	17	[illegible]
Poughkeepsie	6	38	4	20	[illegible]
Newburgh	6	28	2	16	[illegible]
Watertown	8	29	8	20	[illegible]
Kingston	9	38	2	18	[illegible]
Cohoes	3	26	5	6	[illegible]
Oswego	2	21	6	13	[illegible]
Rome	12	15	6	6	[illegible]
Gloversville	3	19	3	13	[illegible]
Third-class cities, 10,000 to 20,000	*86*	*319*	*66*	*239*	[illegible]
Lockport	4	16	2	9	[illegible]
Dunkirk	5	11	......	6	[illegible]
White Plains, village	3	4	5	9	[illegible]
Ogdensburg	7	24	2	10	[illegible]
Peekskill, village	5	6	......	5	[illegible]
Lackawanna	7	3	......	31	[illegible]
Glens Falls	2	17	3	11	[illegible]
Olean	2	11	1	7	[illegible]
Watervliet	4	12	......	10	[illegible]
Middletown	5	18	4	6	[illegible]
Ithaca	3	10	2	8	[illegible]
Corning	1	13	6	25	[illegible]
Hornell	5	18	2	13	[illegible]
Port Chester, village	2	7	5	5	[illegible]
Ossining, village	2	10	3	4	[illegible]
Little Falls	2	10	2	7	[illegible]
North Tonawanda	2	5	......	5	[illegible]
Geneva	4	9	3	4	[illegible]
Saratoga Springs, village	6	18	3	10	[illegible]
Batavia, village	1	9	4	8	[illegible]
Hudson	2	17	1	6	[illegible]
Cortland	2	20	2	11	[illegible]

Total

CITIES	Population U. S. census estimate 1912	Total deaths	Annual death rate per 1,000 population
Third-class cities, 10,000 to 20,000—(Continued)			
Plattsburg	11,602	181	15.6
Fulton	11,230	202	18.0
Johnstown	10,755	123	11.4
Rensselaer	10,719	152	14.2
Oneonta	10,141	162	16.0
Third-class cities, under 10,000	*26,345*	*384*	*14.6*
Port Jervis	9,564	154	16.1
Tonawanda	8,464	108	12.8
Oneida	8,317	122	14.7
TOTAL URBAN MORTALITY	*7,260,570*	*106,726*	*14.*
RURAL MORTALITY	*2,331,688*	*35,651*	*15.*

— (*Continued*)

1912 *in the Cities* — (Continued)

CITIES	Epidemic Diseases										Pulmonary tuberculosis
	Typhoid fever	Malaria	Smallpox	Measles	Scarlet fever	Whooping cough	Diphtheria and croup	Influenza	Erysipelas	Cerebrospinal meningitis	
Third-class cities, 10,000 to 20,000— (Continued)											
Plattsburg	3					4	1	1		1	12
Fulton	2						1			1	14
Johnstown						1		4		1	11
Rensselaer	1			2		2	5				17
Oneonta	2	1					1				7
Third-class cities, under 10,000	*7*					*5*	*5*	*5*		*1*	*37*
Port Jervis	4					5		3			14
Tonawanda	2						1	2		1	15
Oneida	1						4				8
TOTAL URBAN MORTALITY	*832*	*29*	*2*	*934*	*722*	*503*	*1,455*	*471*	*443*	*266*	*11,07*
RURAL MORTALITY	*296*	*25*	*2*	*126*	*67*	*180*	*169*	*586*	*89*	*68*	*2,64*

Total Mor

CITIES	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	
Third-class cities, 10,000 to 20,000—(Continued)							
Plattsburg	1	11	2	6	26	14	
Fulton	2	7	3	12	15	28	
Johnstown	4	8	3	2	21	12	
Rensselaer	2	9	3	3	16	25	
Oneonta	1	16	5	6	16	24	
Third-class cities, under 10,000	*4*	*24*	*1*	*15*	*42*	*47*	
Port Jervis	......	9	......	8	21	12	
Tonawanda	4	3	1	2	10	17	
Oneida	......	12	......	5	11	18	
TOTAL URBAN MORTALITY	*1,877*	*6,069*	*1,274*	*3,210*	*6,117*	*16,367*	*7,4*
RURAL MORTALITY	*376*	*2,181*	*404*	*1,150*	*4,876*	*5,294*	*2,1*

— (*Concluded*)

1912 *in the Cities* — (Concluded)

CITIES	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	Births		
										Total births	Annual birth rate per 1,000 population	Still births
Third-class cities, 10,000 to 20,000— (Concluded)												
Plattsburg	10	4	2	3	16	.....	.....	3	14	255	22.0	9
Fulton	18	6	3	8	13	1	1	6	16	291	25.9	16
Johnstown	7	4	2	2	1	1	.....	1	7	161	15.0	5
Rensselaer	10	3	.....	2	11	.....	.....	6	4	137	14.7	5
Oneonta	6	5	.....	3	20	1	2	2	14	214	21.1	4
Third-class cities, under 10,000	*25*	*9*	.....	*7*	*27*	*5*	.....	*8*	*16*	*465*	*17.7*	*14*
Port Jervis	16	3	.....	5	10	1	.....	3	4	155	16.2	8
Tonawanda	3	.....	.....	1	9	3	.....	3	5	156	18.4	4
Oneida	6	6	.....	1	8	1	.....	2	7	154	18.5	2
TOTAL URBAN MORTALITY	*7,670*	*2,049*	*989*	*3,809*	*5,832*	*1,013*	*371*	*1,003*	*4,626*	*184,966*	*25.8*	*8,676*
RURAL MORTALITY	*2,943*	*767*	*267*	*643*	*2,298*	*327*	*63*	*989*	*1,434*	*42,154*	*18.0*	*1,574*

TABLE 22 — *Summary of Mortality in*
for the Year 1912

SANITARY DISTRICTS	Total deaths	Annual rate per 1,000 population	Deaths years under 1	Death 1 to years
Maritime	80,291	14.3	15,482	7,
Hudson Valley	12,400	16.7	1,626	[illegible]
Adirondack	6,050	14.9	828	
Mohawk Valley	7,863	15.5	1,320	[illegible]
Southern Tier	7,158	15.5	781	
East Central	7,073	16.1	919	
West Central	5,182	16.2	524	
Lake Ontario and Western	16,360	14.7	3,201	
Total	142,377	14.8	24,681	10,
Urban mortality	106,726	14.7	20,474	8
Rural mortality	35,651	15.3	4,207	1

Summary of Mortality in the Sanitary L
—(Continued)

SANITARY DISTRICTS	EPIDEMIC I				
	Typhoid fever	Malaria	Small-pox	Measles	Scarlet fever
Maritime	557	32	2	732	64
Hudson Valley	147	14	....	74	1
Adirondack	47	....	....	3	[illegible]
Mohawk Valley	44	....	....	42	[illegible]
Southern Tier	69	3	....	15	1
East Central	63	2	2	10	1
West Central	57	1	....	22	1
Lake Ontario and Western	144	2	....	152	7
Total	1,128	54	4	1,050	7
Urban mortality	832	29	2	924	7
Rural mortaity	296	25	2	126	

***Summary of Mortality in the Sanitary Districts for the Year* 1912 —(Continued)**

SANITARY DISTRICTS	Pulmonary tuberculosis	Other forms of tuberculosis	Cancer and other malignant tumors	Diabetes	Other general diseases	Diseases of the nervous system	Diseases of the circulatory system	Pneumonia	Other diseases of the respiratory system	Diarrhea and enteritis (under 2 years)	Diarrhea and enteritis (over 2 years)
Maritime	9,193	1,507	4,485	951	2,190	3,649	12,879	5,756	6,512	4,368	654
Hudson Valley	..,136	140	725	124	379	1,426	1,707	890	770	380	146
Adirondack	542	70	341	57	220	782	859	393	342	163	71
Mohawk Valley	542	112	448	108	268	895	1,048	527	442	470	112
Southern Tier	330	68	474	103	270	966	1,138	366	382	188	123
East Central	518	73	482	99	244	862	1,052	463	372	195	65
West Central	284	58	321	47	171	815	799	297	267	121	56
Lake Ontario and Western	1,171	225	974	189	609	1,598	2,179	868	1,085	1,150	199
Total	13,716	2,253	8,250	1,678	4,360	10,993	21,661	9,560	10,172	7,035	1,426
Urban mortality	11,074	1,877	6,069	1,274	3,210	6,117	16,367	7,455	8,264	6,016	970
Rural mortality	2,642	376	2,081	404	1,150	4,876	5,294	2,105	1,908	1,019	456

***Summary of Mortality in the Sanitary Districts for the Year* 1912 —(Concluded)**

SANITARY DISTRICTS	Other diseases of the digestive system	Bright's disease and nephritis	Other diseases of the genito-urinary system	The puerperal state	Congenital debility (under 3 months)	Accidents	Suicides	Homicides	Ill-defined diseases	All other causes	BIRTHS: Total births	BIRTHS: Still births
Maritime	3,516	5,778	1,321	738	3,307	4,353	797	308	633	2,969	146,944	7,018
Hudson Valley	694	1,099	298	81	273	725	88	29	202	468	13,055	567
Adirondack	327	414	143	58	122	349	41	10	217	273	7,854	317
Mohawk Valley	394	651	182	67	162	502	78	7	149	375	10,607	374
Southern Tier	436	612	176	72	127	443	83	8	183	329	8,503	354
East Central	417	553	196	55	149	412	71	8	155	323	8,255	311
West Central	317	416	114	34	78	303	46	12	156	213	5,669	201
Lake Ontario and Western	905	1,090	386	151	234	1,043	136	52	297	1,030	26,233	1,108
Total	7,006	10,613	2,816	1,256	4,452	8,130	1,340	434	1,992	5,980	227,120	10,250
Urban mortality	5,125	7,670	2,049	989	3,809	5,832	1,013	371	1,003	4,526	184,966	8,676
Rural mortality	1,881	2,943	767	267	643	2,298	327	63	989	1,454	42,154	1,574

GREATER NEW YO

The following shows detailed statement
New York as tabulated by the City Depar

Total Number of Deaths by the Princ

BOROUGH	Typhoid fever	Malarial fever	Small-pox	Measles	Sc f
Manhattan........	192	7	......	306	
The Bronx........	26	1	......	109	
Brooklyn..........	231	10	2	203	
Queens...........	48	2	......	41	
Richmond.........	2	......	......	12	
City..........	499	20	2	671	

Total Number of Deaths, etc.–

BOROUGH	Other epidemic diseases	Tuberculosis of the lungs	Tuberculous meningitis	Other forms of tuberculosis
Manhattan........	244	4,068	469	338
The Bronx........	29	1,580	64	49
Brooklyn..........	126	2,441	215	174
Queens...........	13	357	27	29
Richmond.........	4	145	14	11
City..........	416	8,591	789	601

Total Number of Deaths, etc.

BOROUGH	Organic diseases of the heart	Acute bronchitis	Chronic bronchitis	Pneumonia (not including bronchopneumonia)
Manhattan........	4,058	308	37	2,645
The Bronx........	869	26	6	469
Brooklyn..........	3,219	343	101	1,811
Queens...........	529	51	6	292
Richmond.........	215	4	1	101
City..........	8,890	732	151	5,318

Total Number of Deaths, etc.—(Continued)

BOROUGH	Appendicitis and typhlitis	Hernia and intestinal obstruction	Cirrhosis of the liver	Nephritis and Bright's disease	Non-cancerous tumors and other diseases of the female genital organs	Puerperal septicemia	Other puerperal diseases	Congenital debility and malformations
Manhattan	329	316	415	2,801	139	80	226	2,677
The Bronx	45	55	69	443	14	24	49	413
Brooklyn	208	170	361	1,977	85	54	189	1,162
Queens	42	42	60	314	8	11	27	226
Richmond	13	10	21	189	8	3	13	98
City	637	593	926	5,724	254	172	504	4,576

Total Number of Deaths, etc.— (Concluded)

BOROUGH	Senile debility	Violent deaths	Accidents	Homicides	Suicides	Other diseases	Ill-defined causes
Manhattan	262	2,185	1,995	190	449	5,163	47
The Bronx	52	323	305	18	82	711	3
Brooklyn	167	1,121	1,042	79	214	3,457	3
Queens	43	243	234	9	52	548	4
Richmond	15	88	85	3	5	187	4
City	539	3,960	3,661	299	802	10,066	61

Deaths According to Age and Color

BOROUGH	Under 1 year	1	2	3	4	Total under 5	5	10	15	20
Manhattan	7,675	1,885	803	441	318	11,122	773	364	737	1,259
The Bronx	1,122	309	130	74	62	1,697	172	114	187	312
Brooklyn	4,452	1,207	526	285	211	6,681	569	325	493	825
Queens	784	178	72	44	37	1,115	99	49	91	136
Richmond	256	53	22	15	16	362	41	16	21	44
City	14,289	3,632	1,553	850	644	20,977	1,654	868	1,520	2,576

Deaths According to Age and Color

BOROUGH	25	30	35	40	45
Manhattan	1,598	1,750	2,217	2,237	2,232
The Bronx	401	388	430	468	407
Brooklyn	892	1,073	1,305	1,362	1,386
Queens	145	163	192	219	250
Richmond	48	62	76	72	83
City	3,084	3,436	4,220	4,358	4,358

Deaths According to Age and Col

BOROUGH	70	75	80	85	Total
Manhattan	1,580	1,008	641	449	36,548
The Bronx	306	239	137	79	6,944
Brooklyn	1,233	976	627	412	23,994
Queens	220	156	102	77	3,978
Richmond	123	91	61	47	1,544
City	3,462	2,470	1,568	1,064	73,00

* Corrected interborough death-rate means that the dea
the exclusion of the deaths of residents of the other borou
inclusion of the deaths of residents of that borough occurri

Births, Marriages and Still

BOROUGH	Estimated population
Manhattan	2,438,001
The Bronx	531,219
Brooklyn	1,776,878
Queens	334,297
Richmond	92,669
City	5,173,064

TABLE 23 — (*Continued*)

***Record of total deaths recorded in the principal registration districts in each county, etc.*—(Continued)**

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTRY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
BROOME COUNTY—(*Continued*).													
Nanticoke	6										1		5
Sanford	52									2		3	47
Triangle	28		2									1	25
Union	70								2	3		2	63
Vestal	30							1		1	1	2	25
Windsor	35										1	4	30
CATTARAUGUS CO.	*899*	*3*	*9*			*1*	*5*	*6*	*19*	*41*	*12*	*63*	*740*
Allegany	36	1									1		34
Ashford	15									1		1	13
Carrollton	13								3				10
Cold Spring	5											1	4
Conewango	24									1	1	2	20
Dayton	20	1								1		2	16
East Otto	9												9
Elko	4						1						3
Ellicottville	27		1							2		2	22
Farmersville	11										1	1	9
Franklinville	45		3			1				1	1	5	34
Freedom	9												9
Great Valley	18		1				1		1			1	14
Hinsdale	13		1									1	11
Humphrey	5											1	4
Ischua	14									1			13
Leon	18									2		2	14
Little Valley	30		2							4	2	2	20
Lyndon	2											1	1
Machias	43						1		1	2		2	37
Mansfield	7												7
Napoli	9							1					8
New Albion	23							1		1	1	2	18
OLEAN	215	1					1		7	16	1	11	178
Olean	9											1	8
Otto	7									1			6
Perrysburg	14												14
Persia	36		1						1	3	1	6	24
Portville	27										2	2	23
Randolph	41									1		2	38
Red House	13								2			2	9
Salamanca	88							3	4	4	1	5	71
Salamanca	11						1					1	9
South Valley	7												7
Yorkshire	31							1				7	23
CAYUGA COUNTY	*1,108*	*1*	*10*		*3*	*2*	*7*	*6*	*46*	*53*	*12*	*73*	*895*
AUBURN	571		4			1	5	2	33	31	3	38	454
Aurelius	12											1	11
Brutus	47								2	3	1	2	39
Cato	31				1		1			2	1	2	24
Conquest	21									3		2	16
Fleming	10											1	9
Genoa	17											1	16
Ira	26		1						1	1		1	22
Ledyard	24								1	2		2	19
Locke	16												16
Mentz	23											1	22
Montezuma	12						1					2	9
Moravia	43								1	1		3	39
Niles	16										4		12
Owasco	27								2	2		1	22
Scipio	23							1	1	1		2	18

TABLE 23 —(*Continued*

Record of total deaths recorded in the prin tricts in each county, etc.—(Co

[Cities are printed in SMALL CAPS, villages in *italics* and to

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough
CHENANGO COUNTY —(*Continued*).							
Guilford	45	.....	1	.....	.....	.....	.....
Lincklaen	10	.....	.....	.....	.....	.....	.....
McDonough	13	.....	.....	.....	.....	.....	.....
New Berlin	48	1	2	.....	.....	.....	1
North Norwich	12	.....	.....	.....	.....	.....	.....
Norwich	14	.....	.....	.....	.....	.....	.....
Norwich	128	.....	2	.....	1	.....	.....
Otselic	15	.....	.....	.....	.....	.....	.....
Oxford	81	.....	1	.....	.....	.....	.....
Pharsalia	10	.....	.....	.....	.....	.....	.....
Pitcher	11	.....	.....	.....	.....	.....	.....
Plymouth	11	.....	.....	.....	.....	.....	.....
Preston	26	.....	.....	.....	.....	.....	.....
Sherburne	47	.....	.....	.....	.....	.....	.....
Smithville	11	.....	.....	.....	.....	.....	.....
Smyrna	15	.....	.....	.....	.....	.....	.....
CLINTON COUNTY	*619*	*3*	*5*	.....	*3*	.....	
Altona	27	1	1	.....	.....	.....	.....
Ausable	13	.....	.....	.....	.....	.....	.....
Beekmantown	29	.....	1	.....	.....	.....	.....
Black Brook	30	.....	.....	.....	1	.....	.....
Champlain	44	.....	.....	.....	.....	.....	.....
Chazy	34	.....	.....	.....	.....	.....	.....
Clinton	19	.....	.....	.....	1	.....	.....
Dannemora	35	.....	.....	.....	.....	.....	.....
Ellenburgh	24	1	.....	.....	1	.....	.....
Mooers	48	.....	.....	.....	.....	.....	.....
Peru	18	.....	.....	.....	.....	.....	.....
PLATTSBURG	181	1	3	.....	.....	.....	.....
Plattsburg	32	.....	.....	.....	.....	.....	.....
Saranac	38	.....	.....	.....	.....	.....	.....
Schuyler Falls	16	.....	.....	.....	.....	.....	.....
DANNEMORA STATE HOSPITAL (Clinton Prison)	31	.....	.....	.....	.....	.....	.....
*CORTLAND COUNTY	*505*	.....	*6*	.....	*1*	*1*	
Cincinnatus	23	.....	.....	.....	.....	.....	.....
Cortlandville	55	.....	.....	.....	.....	.....	.....
CORTLAND	205	.....	3	.....	.....	.....	.....
Cuyler	10	.....	.....	.....	.....	.....	.....
Freetown	5	.....	.....	.....	.....	.....	.....
Harford	21	.....	.....	.....	1	.....	.....
Homer	44	.....	1	.....	.....	.....	.....
Homer	11	.....	.....	.....	.....	.....	.....
Lapeer	10	.....	.....	.....	.....	.....	.....
Marathon	27	.....	.....	.....	.....	.....	.....
Preble	14	.....	.....	.....	.....	.....	.....
Scott	11	.....	1	.....	.....	.....	.....
Solon	9	.....	1	.....	.....	.....	.....
Taylor	10	.....	.....	.....	.....	1	
Truxton	16	.....	.....	.....	.....	.....	.....
Virgil	17	.....	.....	.....	.....	.....	.....
Willett	17	.....	.....	.....	.....	.....	.....
DELAWARE COUNTY	*690*	.....	*4*	.....	.....	*1*	
Andes	27	.....	1	.....	.....	.....	.....
Bovina	11	.....	.....	.....	.....	.....	.....
Colchester	52	.....	.....	.....	.....	.....	.....

* Statistics for Columbia county on page 198.

TABLE 23 —(*Continued*)

Record of total deaths recorded in the principal registration districts in each county, etc.—(Continued)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
ERIE COUNTY—(*Continued*).													
Eden	31					1						1	29
Elma	16		1						1				14
Evans	51								4	3		1	43
Grand Island	44								1	1		1	41
Hamburg	74			2	1				2	7		2	60
Holland	18						1		1	1		1	14
Lackawanna	410	1	1		1	26	11	1	112	18	1	3	235
Lancaster	24		1							1		4	18
Lancaster	49								1	6	1	2	39
Marilla	20									1		1	18
Newstead	53						1		1	3	1	3	44
North Collins	22		1									1	20
Sardinia	22								1			2	19
TONAWANDA	108	1	2					1	6	15	2	3	78
Tonawanda	23									3		2	18
Wales	14						1			1	2	1	9
West Seneca	77	1			1				2	5	3	5	60
GOWANDA STATE HOSPITAL	59									3		5	51
ESSEX COUNTY	*462*	*4*	*5*				*5*	*4*	*16*	*38*	*6*	*31*	*353*
Chesterfield	55	2					1	1				6	45
Crown Point	36								2		1	2	31
Elisabethtown	18											2	16
Essex	18										1	1	16
Jay	29		2				2		1	1	1	1	21
Keene	14											1	13
Lewis	8								1			1	6
Minerva	11									2		1	8
Moriah	86						1	1	7	4		5	68
Newcomb	5								1				4
North Elba	32	2						1		13			16
North Hudson	9											1	8
St. Armand	14						1			6		1	6
Schroon	10									1	1	1	7
Ticonderoga	71		1					1	2	7		3	57
Westport	18									1	2	1	14
Willsboro	18		1						2	3		2	10
Wilmington	10		1									2	7
FRANKLIN COUNTY	*791*	*1*	*6*			*1*			*29*	*194*	*19*	*38*	*503*
Altamont	26		1						1	3	1	1	19
Bangor	33										3	1	29
Belmont	25								3	2	1	2	17
Bombay	35		2						3	7	1	1	21
Brandon	9								1			1	7
Brighton	12									4			8
Burke	25								1		1	1	22
Chateaugay	41		2						1	1	1	2	34
Constable	19								1	2	1	1	14
Dickinson	28								1	2		2	23
Duane	3												3
Fort Covington	24									2	1	2	19
Franklin	24									10		1	13
Harrietstown	21									6		1	14
Malone	127	1	1						9	8	4	8	96
Malone	51					1			3	6	2	2	37
Moira	31									3	1	2	25
Santa Clara	10												10
Saranac Lake	170									133		7	30
Tupper Lake	37								4	3	1	1	28

TABLE 23 —

Record of total deaths recorded
tricts in each count

[Cities are printed in SMALL CAPS, villag

COUNTRY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial disease
HERKIMER COUNTY	*885*	*8*	*3*	
Columbia	14			
Danube	11			
Fairfield	21	1		
Frankfort	30			
Frankfort	56		1	
German Flats	56			
Herkimer	110	1		
Herkimer	51			
Ilion	110			
Litchfield	9			
LITTLE FALLS	191	1	1	
Little Falls	9	2		
Manheim	51	2		
Newport	16	1		
Norway	19		1	
Ohio	7			
Russia	37			
Salisbury	16			
Schuyler	10			
Stark	13			
Warren	5			
Webb	18			
Wilmurt	3			
Winfield	22			
JEFFERSON COUNTY	*1,217*	*3*	*6*	
Adams	50			
Alexandria	46			
Antwerp	50			
Brownville	44			
Cape Vincent	30			
Carthage	38			
Champion	37			
Clayton	44			
Ellisburg	85		2	
Henderson	24			
Hounsfield	34		1	
LeRoy	36			
Lorraine	10			
Lyme	22			
Orleans	22			
Pamelia	30			
Philadelphia	18			
Rodman	18			
Rutland	30			
Theresa	29			
WATERTOWN	461	1	3	
Watertown	21	1		
Wilna	28	1		
Worth	9			
LEWIS COUNTY	*331*	*2*	*1*	
Croghan	31			
Denmark	28			
Diana	23		1	
Greig	5			
Harrisburg	7			
High Market	7			
Lewis	9			
Leyden	19			
Lowville	64			

TABLE 23 —(*Continu*

Record of total deaths recorded in the pr
tricts in each county, etc.—((

[Cities are printed in SMALL CAPS, villages in *italics* and

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough
MONROE COUNTY—(*Continued*).							
Hamlin	27	....	....	....	....	1	....
Henrietta	23	....	....	....	....	....	....
Irondequoit	45	1	....	....	1	....	....
Mendon	26	....	1	....	....	....	
Ogden	19	....	....	....	....	....	....
Parma	35	....	1	....	....	....	....
Penfield	26	....	....	....	....	....	....
Perinton	56	....	....	....	1	1	
Pittsford	45	....	....	....	1	....	....
Riga	16	....	....	....	....	....	....
ROCHESTER	3,371	7	27	....	28	31	1
Rush	21	....	....	....	....	....	....
Sweden	20	....	....	....	....	....	....
Webster	54	....	1	....	1	1	....
Wheatland	37	....	....	....	....	....	
MONTGOMERY CO.	*889*	*2*	*5*	....	*4*	....	
AMSTERDAM	493	1	4	....	4	....	
Amsterdam	36	....	....	....	....	....	....
Canajoharie	59	....	....	....	....	....	....
Charleston	13	....	....	....	....	....	....
Florida	23	....	....	....	....	....	....
Fort Plain	48	....	....	....	....	....	....
Glen	26	....	....	....	....	....	....
Minden	22	....	....	....	....	....	....
Mohawk	42	....	....	....	....	....	....
Palatine	48	....	....	....	....	....	....
Root	23	....	....	....	....	....	....
St. Johnsville	56	1	1	....	....	....	....
NASSAU COUNTY	*1,196*	*3*	*16*	*5*	*2*	*10*	*1*
Freeport	73	....	1	....	....	....	
Hempstead	434	2	1	2	2	3	
North Hempstead	335	1	8	1	....	1	....
Oyster Bay	307	....	5	2	....	5	
Rockville Center	47	....	1	....	....	1	....
NEW YORK, CITY OF	*73,019*	*207*	*499*	*20*	*615*	*673*	*2*
Boro. of Manhattan	36,559	130	192	7	314	309	1
Boro. of Bronx	6,944	20	26	1	54	109	1
Boro. of Brooklyn	23,994	44	231	10	225	203	8
Boro. of Queens	3,978	10	48	2	16	41	2
Boro. of Richmond	1,544	3	2	....	6	11	
NIAGARA COUNTY	*1,387*	*5*	*34*	....	*8*	*6*	*1*
Cambria	24	....	....	....	....	....	....
Hartland	31	....	1	....	....	....	
Lewiston	34	1	....	....	....	....	
LOCKPORT	291	2	8	....	....	2	
Lockport	43	....	....	....	....	....	....
Newfane	55	....	3	....	....	....	
Niagara	17	....	1	....	....	....	....
NIAGARA FALLS	544	2	23	....	7	4	
NORTH TONAWANDA	136	....	3	....	....	....	
Pendleton	4	....	....	....	....	....	
Porter	38	....	....	....	....	....	....
Royalton	85	....	....	....	....	....	....
Somerset	23	....	....	....	1	....	....
Wheatfield	22	....	....	....	....	....	....
Wilson	40	....	....	....	....	....	....

TABLE 23 —(*Continu*

Record of total deaths recorded in the pri tricts in each county, etc.—(C

[Cities are printed in SMALL CAPS, villages in *italics* and t

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial disease	Scarlet fever	Measles	Whooping cough
ONTARIO COUNTY—(*Continued*).							
GENEVA	213	.....	4	.....	1	5	.....
Geneva	14	.....	.....	.....	.....	.....	.....
Gorham	23	.....	.....	.....	.....	.....	.....
Hopewell	29	.....	.....	.....	.....	.....	.....
Manchester	93	1	1	.....	.....	1	.....
Naples	39	.....	1	.....	.....	.....	1
Phelps	57	.....	1	.....	.....	.....	.....
Richmond	13	.....	.....	.....	.....	.....	.....
Seneca	28	.....	.....	.....	.....	.....	.....
South Bristol	10	.....	.....	.....	.....	.....	.....
Victor	23	.....	1	.....	.....	.....	.....
West Bloomfield	11	.....	.....	.....	.....	.....	.....
ORANGE COUNTY	*1,967*	*6*	*31*	*3*	*4*	*9*	*16*
Blooming Grove	28	.....	2	.....	.....	.....	.....
Chester	31	.....	.....	.....	.....	.....	.....
Cornwall	27	.....	.....	1	.....	.....	1
Cornwall	44	.....	.....	.....	2	.....	1
Crawford	30	.....	.....	.....	.....	.....	.....
Deerpark	30	.....	.....	.....	.....	.....	1
Goshen	110	1	1	.....	.....	.....	1
Greenville	10	.....	.....	.....	.....	1	.....
Hamptonburgh	10	.....	.....	.....	.....	.....	.....
Highlands	63	.....	.....	.....	.....	.....	.....
MIDDLETOWN	374	1	4	.....	1	.....	2
Minisink	31	.....	.....	.....	.....	.....	.....
Monroe	30	.....	1	.....	.....	1	1
Montgomery	38	.....	.....	.....	.....	2	.....
Mount Hope	36	.....	.....	.....	.....	.....	.....
NEWBURGH	519	3	12	1	1	4	3
Newburgh	66	.....	3	1	.....	.....	.....
New Windsor	38	.....	.....	.....	.....	.....	.....
PORT JERVIS	154	.....	4	.....	.....	.....	5
Tuxedo	40	.....	.....	.....	.....	1	.....
Walden	53	.....	1	.....	.....	.....	.....
Wallkill	33	.....	.....	.....	.....	.....	.....
Warwick	103	.....	1	.....	.....	.....	1
Wawayanda	39	.....	.....	.....	.....	.....	.....
Woodbury	30	.....	2	.....	.....	.....	.....
ORLEANS COUNTY	*487*	.....	*1*	.....	*3*	*5*	*6*
Albion	94	.....	.....	.....	.....	2	3
Albion	27	.....	.....	.....	3	.....	.....
Barre	21	.....	1	.....	.....	.....	.....
Carlton	31	.....	.....	.....	.....	2	.....
Clarendon	9	.....	.....	.....	.....	.....	.....
Gaines	39	.....	.....	.....	.....	1	.....
Kendall	21	.....	.....	.....	.....	.....	.....
Medina	91	.....	.....	.....	.....	.....	.....
Murray	70	.....	.....	.....	.....	.....	1
Ridgeway	35	.....	.....	.....	.....	.....	.....
Shelby	26	.....	.....	.....	.....	.....	.....
Yates	23	.....	.....	.....	.....	.....	.....
OSWEGO COUNTY	*1,247*	*1*	*9*	.....	*1*	*8*	[illegible]
Albion	25	.....	.....	.....	.....	.....	.....
Amboy	8	.....	.....	.....	.....	.....	.....
Boylston	4	.....	.....	.....	.....	.....	.....
Constantia	31	.....	.....	.....	.....	.....	.....
FULTON	202	1	2	.....	.....	.....	.....

TABLE 23 —(*Continued*

Record of total deaths recorded in the prin tricts in each county, etc.—(Co

[Cities are printed in SMALL CAPS, villages in *italics* and to

COUNTRY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough
RENSSELAER CO.—(*Continued*).							
Grafton	11						
Hoosick	41						
Hoosick Falls	79					1	
Nassau	22	1					
North Greenbush	24		2				
Petersburg	15						
Pittstown	36						
Poestenkill	18		1				
RENSSELAER	152		1			2	2
Sand Lake	34	1	2				
Schaghticoke	37		1		2		
Schodack	75					2	
Stephentown	22						
TROY	1,520	2	14	1	1	22	[illegible]
ROCKLAND COUNTY	*614*	*2*	*3*		*2*	*4*	
Clarkstown	74	1			1	1	
Haverstraw	89		2				
Nyack	89						
Orangetown	124					1	
Ramapo	108						
Spring Valley	33	1			1	1	
Stony Point	41		1				
Suffern	56					1	
ST. LAWRENCE CO.	*1,411*	*3*	*10*		*1*		
Brasher	26						
Canton	102		1				
Clare	7						
Clifton	5						
Colton	20						
De Kalb	28						
De Peyster	11						
Edwards	19						
Fine	20						
Fowler	15						
Gouverneur	86		1				
Hammond	25						
Hermon	26						
Hopkinton	16						
Lawrence	23						
Lisbon	34						
Louisville	13						
Macomb	18						
Madrid	15						
Massena	36						
Massena	21						
Morristown	25		1				
Norfolk	27						
OGDENSBURG	459	2	6		1		
Oswegatchie	32						
Parishville	28						
Piercefield	14	1					
Pierrepont	12						
Pitcairn	11						
Potsdam	74						
Potsdam	67						
Rossie	14						
Russell	21		1				
Stockholm	30						
Waddington	23						

TABLE 23 —(*Continued*)

Record of total deaths recorded in the principal registration districts in each county, etc.—(Continued)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
SARATOGA COUNTY	*947*	*1*	*12*	.....	.....	*3*	*8*	*2*	*30*	*60*	*16*	*49*	*766*
Ballston	21	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	2	15
Ballston Spa	54	.....	1	.....	.....	.....	1	.....	.....	2	2	3	45
Charlton	10	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	7
Clifton Park	31	.....	1	.....	.....	.....	.....	.....	1	1	.....	2	26
Corinth	39	.....	.....	.....	.....	.....	.....	.....	2	3	1	.....	33
Day	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	9
Edinburgh	14	.....	.....	.....	.....	.....	.....	.....	.....	3	1	.....	10
Galway	19	.....	.....	.....	.....	.....	.....	.....	.....	2	1	1	15
Greenfield	18	.....	1	.....	.....	.....	.....	.....	2	1	.....	1	13
Hadley	10	.....	.....	.....	.....	.....	1	.....	.....	.....	1	1	7
Halfmoon	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	23
Malta	20	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	19
Mechanicville	99	.....	1	.....	.....	.....	3	.....	7	2	.....	3	83
Milton	48	.....	1	.....	.....	.....	1	.....	1	3	.....	.....	42
Moreau	44	.....	.....	.....	.....	1	.....	2	.....	4	1	1	35
Northumberland	12	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	10
Providence	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Saratoga	50	.....	.....	.....	.....	.....	.....	.....	2	4	.....	6	38
Saratoga Springs	15	.....	1	.....	.....	.....	.....	.....	1	3	.....	1	9
Saratoga Springs	272	1	2	.....	.....	.....	.....	.....	6	21	5	18	219
Stillwater	42	.....	2	.....	.....	.....	.....	.....	3	2	2	1	32
Waterford	71	.....	2	.....	.....	1	.....	.....	4	3	.....	3	58
Wilton	21	.....	.....	.....	.....	.....	2	.....	1	.....	.....	2	16
SCHENECTADY CO.	*1,206*	*1*	*3*	.....	.....	*13*	*10*	*3*	*98*	*107*	*9*	*72*	*890*
Duanesburgh	29	.....	.....	.....	.....	.....	.....	.....	.....	2	1	5	21
Glenville	70	.....	.....	.....	.....	.....	.....	.....	1	11	1	3	54
Niskayuna	21	.....	.....	.....	.....	.....	.....	.....	3	2	.....	2	14
Princetown	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
Rotterdam	62	.....	.....	.....	.....	.....	1	.....	4	3	.....	1	53
SCHENECTADY	1,017	1	3	.....	.....	13	9	3	90	89	7	61	741
SCHOHARIE CO.	*363*	*1*	*3*	.....	.....	.....	*1*	*2*	*6*	*17*	*10*	*26*	*297*
Blenheim	12	.....	.....	.....	.....	.....	.....	.....	1	2	.....	1	8
Broome	12	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	11
Carlisle	21	.....	.....	.....	.....	.....	.....	.....	.....	3	1	3	14
Cobleskill	39	1	.....	.....	.....	.....	.....	.....	.....	2	1	1	34
Conesville	4	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	3
Esperance	13	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	11
Fulton	20	.....	.....	.....	.....	.....	.....	.....	1	1	.....	4	14
Gilboa	26	.....	.....	.....	.....	.....	.....	.....	.....	4	1	1	20
Jefferson	23	.....	.....	.....	.....	.....	1	.....	.....	1	5	.....	16
Middleburgh	39	.....	.....	.....	.....	.....	.....	1	1	.....	1	4	32
Richmondville	36	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	2	32
Schoharie	39	.....	.....	.....	.....	.....	.....	.....	1	1	1	3	33
Seward	21	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	3	17
Sharon	31	.....	.....	.....	.....	.....	.....	.....	1	1	.....	1	28
Summit	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	14
Wright	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	10
SCHUYLER COUNTY	*271*	.....	*5*	.....	.....	*1*	.....	*1*	*1*	*14*	*3*	*19*	*227*
Catharine	25	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2	21
Cayuta	7	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
Dix	93	.....	1	.....	.....	1	.....	1	.....	6	1	3	80
Hector	56	.....	2	.....	.....	.....	.....	.....	1	3	1	6	43
Montour	35	.....	1	.....	.....	.....	.....	.....	.....	1	.....	4	29
Orange	14	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	11
Reading	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15
Tyrone	26	.....	.....	.....	.....	.....	.....	.....	.....	1	1	2	22

TABLE 23 —(*Contin*

Record of total deaths recorded in the
tricts in each county, etc.—

[Cities are printed in SMALL CAPS, villages in *italics* ar

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles
SENECA COUNTY	*535*	*1*	*3*	.....	*1*	*2*
Covert	29	.....	.....	.....	.....	.....
Fayette	36	.....	.....	.....	.....	1
Junius	15	.....	.....	.....	.....	.....
Lodi	16	.....	.....	.....	.....	.....
Ovid	23	.....	.....	.....	.....	.....
Romulus	17	.....	.....	.....	1	.....
Seneca Falls	10	.....	.....	.....	.....	.....
Seneca Falls	102	1	.....	.....	.....	1
Tyre	16	.....	1	.....	.....	.....
Varick	19	.....	.....	.....	.....	.....
Waterloo	20	.....	.....	.....	.....	.....
Waterloo	76	.....	1	.....	.....	.....
WILLARD STATE HOSPITAL	156	.....	1	.....	.....	.....
STEUBEN COUNTY	*1,521*	.....	*23*	.....	*5*	1
Addison	42	.....	.....	.....	.....	.....
Avoca	29	.....	1	.....	.....	.....
Bath	59	.....	1	.....	.....	.....
Bath	72	.....	.....	.....	.....	.....
Bradford	6	.....	.....	.....	.....	.....
Cameron	23	.....	1	.....	.....	.....
Campbell	21	.....	1	.....	.....	.....
Canisteo	72	.....	1	.....	.....	.....
Caton	16	.....	.....	.....	.....	.....
Cohocton	43	.....	.....	.....	.....	.....
Corning	78	.....	.....	.....	.....	.....
CORNING	235	.....	8	.....	1	1
Dansville	11	.....	.....	.....	.....	.....
Erwin	39	.....	1	.....	.....	.....
Fremont	14	.....	.....	.....	.....	.....
Greenwood	9	.....	3	.....	.....	.....
Hartsville	6	.....	.....	.....	.....	.....
Hornby	17	.....	.....	.....	.....	.....
HORNELL	203	.....	1	.....	1	.....
Hornellsville	24	.....	.....	.....	.....	.....
Howard	20	.....	.....	.....	.....	.....
Jasper	9	.....	1	.....	.....	.....
Lindley	12	.....	.....	.....	.....	.....
Prattsburg	40	.....	.....	.....	1	.....
Pulteney	20	.....	.....	.....	.....	.....
Rathbone	14	.....	.....	.....	.....	.....
Thurston	9	.....	2	.....	.....	.....
Troupsburg	24	.....	.....	.....	.....	.....
Tuscarora	19	.....	.....	.....	.....	.....
Urbana	43	.....	.....	.....	.....	.....
Wayland	36	.....	.....	.....	2	.....
Wayne	12	.....	.....	.....	.....	.....
West Union	19	.....	1	.....	.....	.....
Wheeler	5	.....	.....	.....	.....	.....
Woodhull	21	.....	1	.....	.....	.....
N. Y. SOLDIERS AND SAILORS' HOME	199	.....	.....	.....	.....	.....
SUFFOLK COUNTY	*2,013*	*4*	*16*	.....	*4*	
Amityville	84	.....	.....	.....	.....	.....
Babylon	71	.....	.....	.....	.....	.....
Babylon	67	.....	1	.....	2	.....
Brookhaven	228	2	.....	.....	.....	
East Hampton	54	.....	.....	.....	1	.....
Greenport	49	.....	1	.....	.....	.....

TABLE 23 —(*Continued*)

Record of total deaths recorded in the principal registration districts in each county, etc.—(Continued)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTRY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
SUFFOLK COUNTY—(*Continued*).													
Huntington	161	1	4	....	....	....	1	1	9	12	5	12	116
Islip	192	....	1	....	....	....	5	....	11	20	2	9	144
Patchogue	41	....	....	....	....	....	1	1	2	3	....	4	30
Riverhead	63	1	....	....	....	....	2	....	3	3	....	3	51
Shelter Island	10	....	....	....	....	....	....	....	....	....	....	....	10
Smithtown	57	....	....	....	1	....	2	....	3	3	1	5	42
Southampton	115	....	....	....	....	1	....	2	5	10	....	7	90
Sag Harbor	46	....	....	....	....	....	1	....	2	5	....	5	33
Southold	71	....	1	....	....	....	2	1	6	1	1	5	54
STATE HOSPITALS:													
Central Islip	429	....	8	....	....	....	....	....	1	60	....	3	352
Kings Park	280	....	....	....	....	....	....	....	....	28	....	6	246
SULLIVAN COUNTY	*574*	....	*6*	....	....	....	*1*	*1*	*9*	*164*	*7*	*36*	*350*
Bethel	32	....	1	....	....	....	....	....	1	3	....	2	25
Callicoon	31	....	....	....	....	....	....	....	1	4	....	1	25
Cochecton	14	....	....	....	....	....	....	....	....	....	....	....	14
Delaware	20	....	....	....	....	....	....	....	1	2	1	1	15
Fallsburgh	56	....	2	....	....	....	....	....	2	7	1	5	39
Forestburgh	6	....	....	....	....	....	....	....	....	2	....	1	3
Fremont	12	....	....	....	....	....	....	....	....	1	....	....	11
Highland	13	....	....	....	....	....	....	....	....	2	....	....	11
Liberty	167	....	2	....	....	....	....	....	2	110	....	8	45
Lumberland	9	....	....	....	....	....	....	....	....	....	....	1	8
Mamakating	42	....	....	....	....	....	....	....	....	7	1	2	32
Neversink	28	....	....	....	....	....	....	....	....	1	....	7	20
Rockland	52	....	....	....	....	....	1	....	....	1	2	6	42
Thompson	76	....	1	....	....	....	....	1	2	24	1	2	45
Tusten	16	....	....	....	....	....	....	....	....	....	1	....	15
TIOGA COUNTY	*446*	....	*5*	....	....	....	*2*	....	*11*	*18*	*3*	*25*	*382*
Barton	23	....	1	....	....	....	....	....	....	2	....	1	19
Berkshire	14	....	....	....	....	....	....	....	....	1	....	1	12
Candor	43	....	....	....	....	....	....	....	2	1	....	3	37
Newark Valley	41	....	....	....	....	....	1	....	....	2	1	1	36
Nichols	26	....	....	....	....	....	....	....	....	1	1	1	23
Owego	72	....	....	....	....	....	....	....	2	....	....	3	67
Owego	89	....	1	....	....	....	1	....	1	3	1	6	76
Richford	14	....	....	....	....	....	....	....	2	....	....	1	11
Spencer	25	....	2	....	....	....	....	....	....	....	....	1	22
Tioga	36	....	1	....	....	....	....	....	2	....	....	4	29
Waverly	63	....	....	....	....	....	....	....	2	8	....	3	50
TOMPKINS COUNTY	*554*	*1*	*3*	....	....	....	*2*	*1*	*11*	*22*	*18*	*32*	*464*
Caroline	27	....	....	....	....	....	....	....	1	....	1	2	23
Danby	18	....	....	....	....	....	....	....	....	1	....	3	14
Dryden	68	....	....	....	....	....	....	....	2	2	1	4	59
Enfield	12	....	....	....	....	....	....	....	....	....	1	3	8
Groton	45	....	....	....	....	....	....	....	1	3	2	3	36
ITHACA	231	....	3	....	....	....	1	1	4	10	3	10	199
Ithaca	23	....	....	....	....	....	....	....	....	1	1	1	20
Lansing	39	....	....	....	....	....	....	....	3	3	1	3	29
Newfield	26	1	....	....	....	....	....	....	....	1	3	1	20
Ulysses	65	....	....	....	....	....	1	....	....	2	4	2	56
ULSTER COUNTY	*1,378*	*3*	*17*	*3*	....	*6*	*18*	*8*	*31*	*123*	*21*	*80*	*1,068*
Denning	1	....	....	....	....	....	....	....	....	....	....	....	1
Ellenville	60	....	1	....	....	....	....	....	....	8	....	5	46
Esopus	55	....	....	....	....	....	1	1	1	2	2	....	48
Gardiner	24	....	....	1	....	....	1	....	1	....	1	2	18

TABLE 23 —(*Continued*)

Record of total deaths recorded in the principal registration districts in each county, etc.—(Continued)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
ULSTER COUNTY—(*Continued*).													
Hardenburg	6									1			5
Hurley	38			1					1	1		1	34
KINGSTON	481	1	5				7	3	9	50	5	38	363
Kingston	11						1	1		1	1	1	6
Lloyd	43			1					1	2		4	35
Marbletown	43								1	3		1	38
Marlboro	41		2						2	2		1	34
New Paltz	62		3			1	1		2	3		6	46
Olive	48		1						3	2		2	40
Plattekill	27								1	1	1	2	22
Rochester	45								1	3		3	38
Rosendale	41		1					1	1	2	1	1	34
Saugerties	54		2				2			5	2	2	41
Saugerties	110	2				4	3	1	4	21	2	5	68
Shandaken	35									4	2	3	26
Shawangunk	28					1		1			1		25
Ulster	46		1				1		2	2	1	2	37
Wawarsing	52		1							7	2	1	41
Woodstock	27						1		1	3			22
WARREN COUNTY	*471*	*1*	*8*			*1*		*4*	*15*	*36*	*11*	*26*	*369*
Bolton	26		1								1		24
Caldwell	22									1		2	19
Chester	25									2	1	2	20
GLENS FALLS	235		4			1		4	11	16	7	17	175
Hague	13									1			12
Horicon	16		1						1		1	1	12
Johnsburg	31		1						2	2		1	25
Luzerne	19									2			17
Queensbury	32	1							1	3	1	1	25
Stony Creek	8									1			7
Thurman	11									2			9
Warrensburg	33		1							6		2	24
WASHINGTON CO.	*699*	*1*	*6*				*2*	*1*	*29*	*42*	*17*	*37*	*564*
Argyle	45									1		2	42
Cambridge	39								2	2		2	33
Dresden	7												7
Easton	23								2	1		3	17
Fort Ann	33									4		2	27
Fort Edward	77	1	1						3	8	1		63
Granville	85								3	2	1	7	72
Greenwich	83								3	5	6	5	64
Hampton	14									2	1		11
Hartford	19								2	1		1	15
Hebron	24									3		2	19
Hudson Falls	69		1					1	7	2	4	5	49
Jackson	17								2			3	12
Kingsbury	21									3		1	17
Putnam	5											1	4
Salem	51						2		1	1	2	2	43
White Creek	23									4			19
Whitehall	10								1			1	8
Whitehall	54		4						3	3	2		42
WAYNE COUNTY	*763*	*4*	*8*		*2*	*5*	*2*	*6*	*24*	*32*	*11*	*48*	*621*
Arcadia	25								2			2	21
Butler	27	1							1		1	3	21
Clyde	57		2			2		1	1	2		4	45
Galen	27		1						1		1	2	23

TABLE 23 —(*Continued*)

***Record of total deaths recorded in the principal registration districts in each county, etc.*—(Continued)**

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
WAYNE COUNTY—(*Continued*).													
Huron	14		1								2		11
Lyons	70								3	3	1	4	59
Lyons	41				1					1		2	37
Macedon	29								1	1	2	2	23
Marion	29						1		1	3		1	23
Newark	113		1		1			3	7	5		5	91
Ontario	50	1							3	1		2	43
Palmyra	56					2				5		4	45
Rose	24										2	2	20
Savannah	29		2							5		1	21
Sodus	62	2					1			3		3	53
Walworth	26							1	3	1		3	18
Williamson	43		1			1		1	1		1	4	34
Wolcott	41									2	1	4	34
WESTCHESTER CO.	*4,063*	*12*	*26*	*7*	*21*	*47*	*27*	*55*	*288*	*338*	*13*	*245*	*2,984*
Bedford	84								2	20	1	5	56
Cortlandt	98			4				2	4	4	1	3	80
Dobbs Ferry	47		1						2	3		3	38
Eastchester	104	1			5	12	2	1	3	10		9	61
Greenburgh	54							1	6	4			43
Harrison	54						3		4	7		1	39
Hastings-on-Hudson	47					2		1	7	1		3	33
Irvington	15									4		1	10
Lewisboro	18								1	2		1	14
Mamaroneck	124	1				1	1		8	6	2	10	95
Mount Pleasant	286	1	1		2	3	2		4	78		69	126
MT. VERNON	401	1	4		1	8	5	6	18	22		28	308
New Castle	40					1	1	1	2				35
NEW ROCHELLE	379	1	3		4	16	7	5	19	18	2	17	287
North Castle	31					1			4	3		3	20
North Salem	20									1		1	18
North Tarrytown	64								4	5		1	54
Ossining	15							1	1	1	1		11
Ossining	200	1	3		1			2	8	11	2	10	162
Peekskill	191					3		2	14	7		6	159
Pelham	19								1	1		1	16
Port Chester	195		1	3	3			4	32	5	1	7	139
Poundridge	11									1			10
Rye	49							1	5	3		3	37
Scarsdale	10									2		1	7
Somers	21		1				1					1	18
Tarrytown	104		3		1				6	4		5	85
White Plains	7									2			5
White Plains	256		2				2	2	18	16		4	212
YONKERS	1,083	6	7		4		2	26	113	95	3	49	778
Yorktown	36						1		2	2		3	28
WYOMING COUNTY	*419*		*4*				*2*	*1*	*5*	*18*	*10*	*28*	*351*
Arcade	24								1	1	1	1	20
Attica	34		2						2	1		2	27
Bennington	33									4		2	27
Castile	37									1		4	32
Covington	6								1			1	4
Eagle	10											1	9
Gainesville	28		1							1		1	25
Genesee Falls	6												6
Java	26										2	1	23
Middlebury	19									2	1	1	15
Orangeville	21									2	3	1	15

TABLE 23 —(*Concluded*)

Record of total deaths recorded in the principal registration districts in each county, etc.—(Concluded)

[Cities are printed in SMALL CAPS, villages in *italics* and towns in Roman type.]

COUNTY AND REGISTRATION DISTRICTS	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea (under 2 years)	Tuberculosis of lungs	Influenza	Cancer	All other causes
WYOMING COUNTY —(*Continued*).													
Perry	43		1				1	1	1	1	2		36
Perry	18									1		1	16
Pike	15											3	12
Sheldon	17											1	16
Warsaw	74						1			4	1	7	61
Wethersfield	8											1	7
YATES COUNTY	*272*					*3*	*1*		*1*	*9*	*11*	*14*	*233*
Barrington	14									2		2	10
Benton	23									1		1	21
Italy	11									2		1	8
Jerusalem	35					1					2	2	30
Middlesex	16										2	1	13
Milo	30									1	1		28
Penn Yan	84					2			1	2		5	74
Potter	15											1	14
Starkey	35						1			1	6	1	26
Torrey	9												9
COLUMBIA COUNTY	*690*		*12*		*1*	*10*	*4*	*3*	*21*	*49*	*13*	*45*	*532*
Ancram	17		2							1	2		12
Austerlitz	13									1	1	2	9
Canaan	14							1		1		1	11
Chatham	69		1			1			2	1	3	3	58
Claverack	62							1		4		4	53
Clermont	6												6
Copake	21						2		1	1	1	1	15
Gallatin	11		1								1	1	8
Germantown	27									3	1	2	21
Ghent	40									5		2	33
Greenport	14								2	1	1	1	9
Hillsdale	20									2		1	17
HUDSON	211		3		1	4	2		10	14	1	17	159
Kinderhook	57		1						2	5	1	3	45
Livingston	22		2			1				2	1	1	15
New Lebanon	22							1		2		3	16
Stockport	28		1			3			1	4		3	16
Stuyvesant	26		1						3	1			21
Taghkanic	10					1				1			8
* *Summary of deaths in public institutions*													
State prisons	71									17			54
State hospitals for insane	1,979		12					1		257	67	337	1,305
Other public institutions	448		13					1		60	2	10	362

* This data has been included in county totals with cities in which institutions are located or at end of county.

TABLE 24

Deaths by Causes 1885 *to Date*

YEAR	All deaths	Death rate	Deaths under five years of age	Epidemic Diseases: Cerebro-spinal meningitis	Epidemic Diseases: Typhoid fever	Epidemic Diseases: Malarial diseases
1885	80,407	14.3	30,027	446	1,067	944
1886	86,801	15.2	32,928	572	1,169	899
1887	108,269	18.6	35,114	540	1,327	935
1888	114,584	19.3	38,345	490	1,483	813
1889	113,155	18.6	40,243	402	1,550	746
1890	128,648	20.8	37,392	474	1,612	738
1891	129,850	20.5	42,740	589	1,926	619
1892	131,388	20.3	42,434	649	1,664	613
1893	129,659	19.7	41,643	875	1,685	493
1894	123,423	18.6	41,472	489	1,640	422
1895	128,834	19.1	42,002	546	1,716	409
1896	126,253	18.4	40,136	510	1,542	449
1897	118,525	17.1	35,771	538	1,351	380
1898	122,584	17.4	37,113	695	1,810	404
1899	121,831	17.0	35,386	702	1,604	248
1900	132,352	18.2	39,204	531	1,948	309
1901	131,461	17.7	35,775	492	1,741	283
1902	124,657	16.4	31,215	456	1,318	189
1903	127,602	16.4	32,768	454	1,665	137
1904	142,014	17.8	39,086	1,708	1,652	149
1905	137,222	17.0	38,045	2,566	1,554	106
1906	140,773	17.1	39,292	1,178	1,568	139
1907	147,890	17.6	40,168	230	1,673	136
1908	138,912	16.3	37,941	539	1,375	[illegible]
1909	140,261	16.1	38,278	485	1,315	[illegible]
1910	147,629	16.1	39,690	452	1,374	65
1911	145,776	15.5	35,878	389	1,316	63
1912	142,377	14.8	34,787	333	1,128	54

Deaths by Causes 1885 *to Date* — (*Continued*)

YEAR	Epidemic Diseases — (*Continued*): Small-pox	Scarlet fever	Measles	Erysipelas	Whooping cough	Croup and diphtheria	Diarrhea (under 2 years)
1885	33	1,184	1,170	354	834	4,508	7,301
1886	39	1,011	895	357	1,244	5,597	7,028
1887	175	1,267	1,205	327	447	6,490	9,258
1888	212	2,452	944	342	994	6,448	8,774
1889	30	2,205	899	293	1,303	5,855	8,294
1890	4	913	1,161	312	1,156	4,915	8,468
1891	4	2,252	1,200	367	825	5,072	9,179
1892	143	2,177	1,350	477	921	5,918	9,185
1893	252	1,626	789	366	1,203	5,947	9,056
1894	308	1,227	900	331	1,020	6,592	8,956
1895	11	850	1,266	370	1,169	4,989	9,055
1896	3	759	1,495	340	996	4,597	8,776
1897	27	841	873	303	825	4,115	7,267
1898	1	837	838	237	1,155	2,612	8,499
1899	21	730	756	353	886	2,786	6,480
1900	14	689	1,333	466	1,020	3,306	7,959
1901	445	1,430	859	363	721	3,026	9,337
1902	442	1,215	929	314	923	2,859	8,315
1903	41	1,057	721	354	811	3,035	7,480
1904	13	1,194	1,170	430	426	3,041	8,329
1905	9	726	988	415	847	2,296	8,955
1906	7	690	1,369	452	821	2,691	8,578
1907	10	1,032	997	483	789	2,003	9,213
1908	3	1,688	1,175	419	503	2,473	9,111
1909	4	1,205	1,272	472	783	2,313	7,873
1910	7	1,617	1,285	526	727	2,433	9,036
1911	3	1,149	977	573	819	1,963	7,301
1912	4	789	1,050	532	683	1,624	7,035

Deaths by Causes 1885 *to Date* — (*Continued*)

YEAR	Other Causes of Death				
	Consumption	Acute respiratory diseases	Puerperal	Digestive	Urinary
1885	11,238	10,864	974	4,343	4,069
1886	11,947	11,389	884	5,066	4,305
1887	11,609	11,557	885	5,599	4,582
1888	12,383	13,756	1,069	6,146	4,926
1889	12,390	13,833	979	6,501	5,732
1890	13,831	18,053	928	7,696	5,688
1891	13,445	20,647	1,053	8,486	6,473
1892	13,471	20,432	1,131	8,920	6,502
1893	13,123	19,807	1,054	8,834	6,955
1894	12,824	15,885	911	8,745	6,946
1895	13,267	17,725	939	8,892	7,449
1896	13,265	16,820	972	8,955	7,770
1897	12,641	16,277	1,013	8,963	7,866
1898	12,979	16,350	920	10,101	8,641
1899	13,412	17,938	877	10,163	9,064
1900	13,590	19,232	1,136	10,644	9,501
1901	13,766	17,589	1,068	7,478	9,558
1902	12,582	16,986	1,034	7,235	9,604
1903	13,194	17,339	1,110	7,282	9,998
1904	14,159	21,132	1,272	7,866	10,815
1905	14,061	17,832	1,377	8,158	10,697
1906	14,027	20,178	1,326	8,741	11,344
1907	14,431	22,663	1,413	9,035	12,163
1908	14,347	18,477	1,335	8,398	11,329
1909	13,996	20,829	1,333	8,791	12,196
1910	14,059	21,529	1,452	9,338	12,811
1911	14,205	22,189	1,449	8,873	12,547
1912	13,716	19,732	1,256	8,432	13,429

Deaths by Causes 1885 *to Date* — (*Concluded*)

YEAR	Other Causes of Death — (*Concluded*)					
	Circulatory	Nervous	Cancer	Violence	Old age	Unclassified
1885	4,069	8,651	1,887	2,994	4,889	7,728
1886	5,238	8,799	2,050	3,296	5,990	8,981
1887	5,737	9,957	2,363	3,780	8,676	9,736
1888	6,394	11,174	2,497	3,842	7,994	11,310
1889	6,886	11,266	2,638	3,834	5,980	12,615
1890	7,306	11,593	2,868	4,542	5,484	18,728
1891	8,480	13,166	3,028	5,028	6,530	15,371
1892	9,013	14,009	3,152	5,543	6,385	14,647
1893	9,042	13,826	3,232	5,295	5,826	14,622
1894	8,451	12,948	3,305	5,487	5,497	15,310
1895	9,966	11,724	3,554	5,889	5,569	16,380
1896	10,486	11,925	3,789	7,022	5,377	14,835
1897	10,905	12,124	4,131	6,172	5,516	14,950
1898	10,511	13,312	4,385	6,520	5,524	14,641
1899	10,606	13,177	4,533	6,093	6,068	15,324
1900	10,676	12,993	4,871	6,714	5,402	16,134
1901	11,949	13,366	5,033	7,926	5,439	17,388
1902	12,889	12,964	4,990	7,058	4,949	15,833
1903	13,561	12,966	5,456	7,646	4,765	17,466
1904	14,309	14,142	5,697	8,822	5,120	19,858
1905	14,547	13,569	6,056	8,352	4,923	19,025
1906	15,395	13,521	6,168	8,874	4,332	18,944
1907	16,952	14,539	6,420	9,668	2,723	20,717
1908	17,233	11,989	6,554	9,183	2,516	20,181
1909	18,784	11,191	7,060	9,232	2,189	18,860
1910	19,497	11,404	7,522	9,846	1,951	20,698
1911	21,331	11,385	7,970	10,575	1,616	19,083
1912	21,661	10,993	8,250	9,904	1,795	19,977

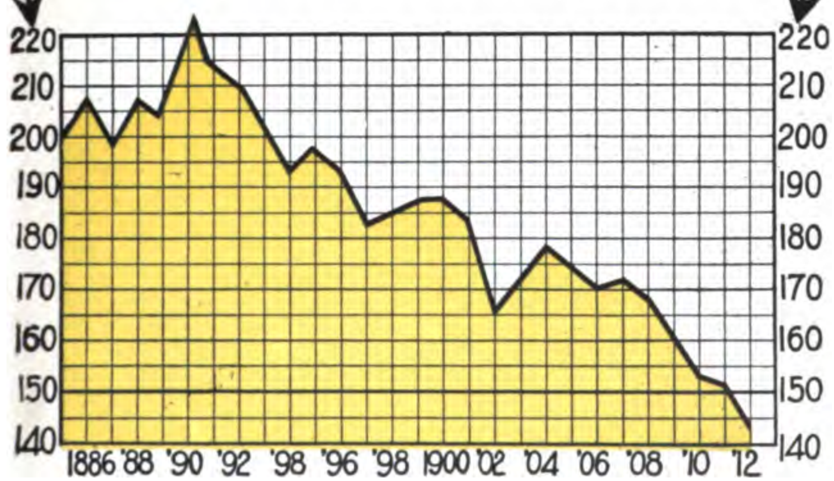
Deaths by Causes 1885 *to Date* —

YEAR	OTHER (	
	Consumption	Acute respiratory diseases
1885	11,238	10,864
1886	11,947	11,389
1887	11,609	11,557
1888	12,383	13,756
1889	12,390	13,833
1890	13,831	18,053
1891	13,445	20,647
1892	13,471	20,432
1893	13,123	19,807
1894	12,824	15,885
1895	13,267	17,725
1896	13,265	16,820
1897	12,641	16,277
1898	12,979	16,350
1899	13,412	17,938
1900	13,590	19,232
1901	13,766	17,589
1902	12,582	16,986
1903	13,194	17,339
1904	14,159	21,132
1905	14,061	17,832
1906	14,027	20,178
1907	14,431	22,663
1908	14,347	18,477
1909	13,996	20,829
1910	14,059	21,529
1911	14,205	22,189
1912	13,716	19,732

Deaths by Causes 1885 *to Date* —

YEAR	OTHER CAUSES OF D		
	Circulatory	Nervous	Cancer
1885	4,069	8,651	1,887
1886	5,238	8,799	2,050
1887	5,737	9,957	2,363
1888	6,394	11,174	2,497
1889	6,886	11,266	2,638
1890	7,306	11,593	2,868
1891	8,480	13,166	3,028
1892	9,013	14,009	3,152
1893	9,042	13,826	3,232
1894	8,451	12,948	3,305
1895	9,966	11,724	3,554
1896	10,486	11,925	3,789
1897	10,905	12,124	4,131
1898	10,511	13,312	4,385
1899	10,606	13,177	4,533
1900	10,676	12,993	4,871
1901	11,949	13,366	5,033
1902	12,889	12,964	4,990
1903	13,561	12,966	5,456
1904	14,309	14,142	5,697
1905	14,547	13,569	6,056
1906	15,395	13,521	6,168
1907	16,952	14,539	6,420
1908	17,233	11,989	6,554
1909	18,784	11,191	7,060
1910	19,497	11,404	7,522
1911	21,331	11,385	7,970
1912	21,661	10,993	8,250

MORTALITY
FROM
PULMONARY TUBERCULOSIS.
DEATHS PER 100,000 POPULATION SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

The number of deaths and death rate from pulmonary tuberculosis in 5 year periods since 1885 *is shown by the following:*

FIVE-YEAR PERIODS	Yearly average	Percentage of total mortality	Deaths per 100,000 population
1885–9	12,000	12.6	214
1890–4	13,340	11.0	214
1895–9	13,113	11.0	187
1900–4	13,458	10.4	180
1905–9	14,072	10.1	169
1910–12	14,000	9.7	155

TABLE 29 — (*Concluded*)

CITIES	1909		1910		1911		1912	
	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis	Deaths per 100,000 population from tuberculosis	Percentage of total deaths from tuberculosis
Cities, over 175,000:								
City of New York	194.2	11.7	182.3	11.3	177.3	11.6	167.9	11.2
Buffalo	131.8	8.6	120.3	7.4	114.9	7.9	118.9	8.1
Rochester	143.3	9.7	127.0	9.0	107.4	7.5	92.5	6.4
Cities, 50,000 to 175,000:								
Syracuse	115.6	7.5	89.6	5.8	96.4	6.7	88.2	5.9
Albany	168.7	9.6	238.4	12.3	240.9	11.7	208.9	10.1
Yonkers	148.2	9.5	150.3	9.8	113.8	8.0	107.8	9.0
Troy	239.5	12.5	227.8	11.0	226.1	10.7	207.6	10.5
Utica	159.8	9.7	126.3	7.2	125.8	6.7	122.3	6.5
Schenectady	117.7	10.2	99.0	6.7	86.3	6.8	112.0	8.7
Cities, 20,000 to 50,000:								
Binghamton	78.5	5.1	119.7	7.6	102.5	5.4	120.0	6.7
Elmira	97.3	6.2	51.1	3.4	47.9	3.2	63.6	4.3
Auburn	99.2	6.8	118.2	7.9	105.1	5.8	87.0	5.4
Jamestown	63.2	5.3	73.5	5.7	73.6	5.8	65.2	5.5
Amsterdam	150.3	9.0	102.3	5.9	102.7	7.8	92.0	6.5
Mount Vernon	104.0	7.4	109.9	7.8	55.6	4.3	65.4	5.4
Niagara Falls	106.2	7.3	105.1	5.8	89.1	4.8	111.6	6.6
New Rochelle	92.2	7.1	83.1	7.0	83.9	7.7	54.6	4.7
Poughkeepsie	130.5	6.8	125.2	7.5	129.2	6.6	75.3	4.5
Watertown	106.6	7.0	78.5	4.4	99.7	6.0	62.1	3.7
Kingston	237.4	11.9	177.5	9.7	222.8	11.6	190.0	10.4
Newburgh	156.8	9.1	179.8	9.8	149.1	7.7	193.1	10.6
Cohoes	244.0	12.1	198.3	9.6	164.9	8.5	168.0	9.5
Oswego	97.6	6.5	72.7	4.4	110.1	7.1	132.0	7.8
Gloversville	117.2	7.3	77.4	5.0	104.0	6.5	73.6	5.2
Rome	111.0	5.5	126.8	6.3	253.7	11.0	287.2	12.9
Cities, 10,000 to 20,000:								
Lockport	127.3	8.3	139.1	8.4	71.8	4.1	114.1	7.2
Dunkirk	55.3	5.0	69.6	4.3	90.3	6.0	60.6	4.8
Ogdensburg	114.0	7.0	106.6	6.3	259.1	10.8	231.1	8.2
Middletown	120.4	7.8	179.5	9.8	236.5	9.3	250.8	10.2
Glens Falls	147.4	10.6	118.0	7.5	136.5	7.1	103.2	6.8
Watervliet	198.5	12.6	139.3	8.0	138.0	8.0	136.9	7.8
Ithaca	83.4	6.1	101.3	6.1	94.1	4.9	67.0	4.3
Olean	50.0	4.3	47.4	3.7	59.3	4.2	103.2	7.4
Lackawanna	......	......	123.6	4.5	89.4	3.4	112.4	4.4
Corning	78.0	5.5	51.0	3.5	58.0	4.3	108.2	6.4
Hornell	95.0	6.5	36.7	2.9	72.8	4.7	36.0	2.4
Geneva	110.7	8.9	104.4	7.4	79.9	6.4	39.8	2.3
Little Falls	155.6	9.9	73.3	4.7	158.9	9.5	78.0	5.2
North Tonawanda	72.9	4.9	67.0	5.0	104.5	8.3	31.3	3.0
Cortland	47.8	3.7	26.1	1.4	25.9	1.5	94.6	5.3
Hudson	126.9	8.1	227.7	11.0	171.3	9.1	118.2	6.6
Plattsburg	139.7	8.1	206.4	11.7	149.2	9.3	103.4	6.6
Rensselaer	90.0	7.0	140.0	9.5	55.9	4.1	158.5	11.1
Fulton	68.0	4.8	124.0	8.4	64.3	4.0	124.6	7.0
Johnstown	105.5	6.4	105.2	7.7	188.4	13.2	102.3	9.0
Cities, under 10,000:								
Oneonta	125.0	7.2	63.2	3.3	71.1	4.1	68.9	4.3
Port Jervis	80.4	4.4	118.0	6.5	75.9	4.5	146.3	9.1
Oneida	49.5	3.6	24.0	1.7	72.2	4.8	96.1	6.6
Tonawanda	123.0	8.6	84.4	6.7	107.2	8.8	177.2	13.9
Whole State	161.0	10.0	153.5	9.5	151.3	9.7	142.9	9.6

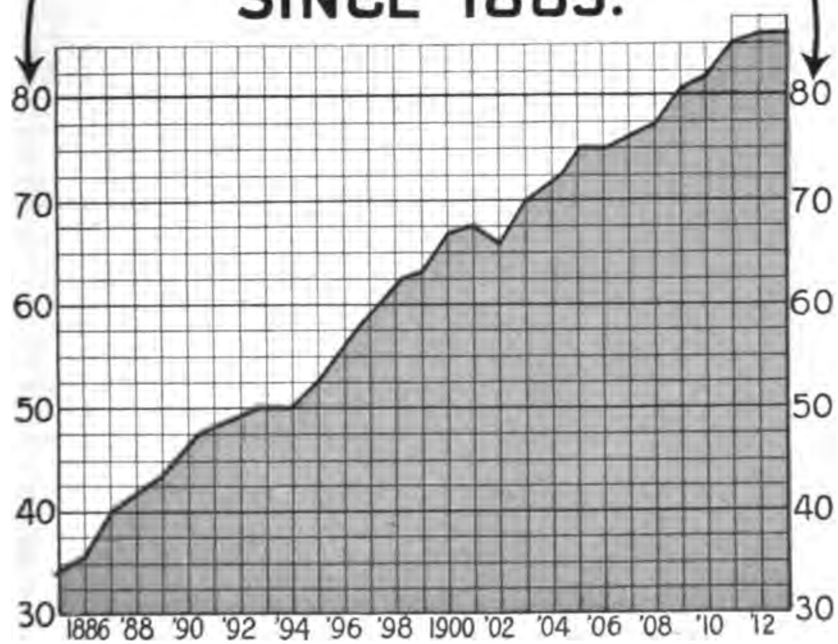
TABLE 29

City Mortality for Tu

CITIES	1901-1905 Deaths per 100,000 population from tuberculosis	1901-1905 Percentage of total deaths from tuberculosis	1906 Deaths per 100,000 population from tuberculosis
Cities, over 175,000:			
City of New York	215.8	11.6	218.2
Buffalo	132.0	8.7	129.9
Rochester	138.2	9.5	135.2
Cities, 50,000 to 175,000:			
Syracuse	135.2	9.4	116.2
Albany	228.0	12.6	206.1
Yonkers	188.2	11.6	169.9
Troy	276.5	13.6	270.6
Utica	174.7	9.6	130.8
Schenectady	141.7	9.3	116.3
Cities, 20,000 to 50,000:			
Binghamton	139.0	8.1	121.3
Elmira	134.0	8.7	131.7
Auburn	143.3	9.1	158.1
Jamestown	93.0	9.0	82.7
Amsterdam	149.5	9.5	129.2
Mount Vernon	115.1	8.1	101.6
Niagara Falls	99.8	6.2	71.9
New Rochelle	94.9	7.0	116.3
Poughkeepsie	174.2	8.8	136.0
Watertown	95.6	6.4	88.8
Kingston	209.0	11.0	184.3
Newburgh	261.4	11.9	192.5
Cohoes	220.8	11.3	233.3
Oswego	150.0	9.4	177.3
Gloversville	107.9	7.8	107.5
Rome	171.7	10.0	73.4
Cities, 10,000 to 20,000:			
Lockport	135.8	8.7	91.4
Dunkirk	81.4	5.1	100.6
Ogdensburg	331.7	12.5	141.9
Middletown	202.5	10.0	106.9
Glens Falls	149.5	9.5	147.3
Watervliet	177.6	10.6	172.4
Ithaca	129.7	8.4	68.0
Olean	54.9	4.8	70.0
Lackawanna	*	......	......
Corning	119.7	8.2	79.1
Hornell	116.3	8.0	123.1
Geneva	83.7	5.9	104.0
Little Falls	105.3	9.2	127.3
North Tonawanda	92.6	7.6	60.0
Cortland	73.6	6.0	87.0
Hudson	184.3	9.7	133.3
Plattsburg	171.0	11.3	60.0
Rensselaer	148.6	8.6	93.4
Fulton	121.3	8.3	11 4
Johnstown	104.9	7.9	135.4
Cities, under 10,000:			
Oneonta	91.0	5.9	97.1
Port Jervis	173.4	10.0	92.8
Oneida	126.2	8.9	71.4
Tonawanda	117.1	8.7	113.9
Whole State	174.7	10.3	170.0

* Not incorporated as a city till 1910.

MORTALITY
FROM
CANCER.
DEATHS PER
100,000 POPULATION
SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

TABLE 33 — *Deaths from Cancer per* 100,000 *population in the* —

DISTRICTS	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Maritime	61	71	72	72	75	75	79	78	79	80
Hudson Valley	77	78	78	82	80	86	80	95	95	98
Adirondack and Northern	60	64	75	68	66	64	81	76	87	84
Mohawk Valley	66	73	76	69	76	72	85	84	80	89
Southern Tier	72	78	78	75	80	87	91	92	106	103
East Central	79	80	80	82	80	83	90	91	99	110
West Central	86	80	90	87	91	93	92	101	110	100
Lake Ontario and Western	75	78	81	80	73	75	73	79	90	88
Entire State	70	72	75	75	76	77	81	82	85	86

TABLE 34 — *In each* 1,000 *Deaths there were from Cancer in the* —

DISTRICTS	Decade 1895-1904	1905	1906	1907	1908	1909	1910	1911	1912
Maritime	31.8	39.4	30.9	40.7	44.6	47.4	48.9	51.5	55.9
Hudson Valley	37.6	44.2	48.1	44.1	49.5	53.3	54.2	52.9	58.5
Adirondack and Northern	42.0	48.0	45.1	43.1	43.8	54.5	48.8	54.5	56.4
Mohawk Valley	42.5	48.8	42.8	46.1	44.6	55.8	52.6	51.1	56.9
Southern Tier	46.5	53.3	51.3	50.5	55.7	59.1	60.7	65.6	66.0
East Central	51.8	52.0	53.8	50.3	51.2	57.8	56.1	62.9	68.1
West Central	49.5	57.2	56.1	55.2	60.8	60.5	67.2	66.4	61.9
Lake Ontario and Western	46.5	54.0	52.1	45.8	50.9	48.4	51.5	61.4	59.5
Entire State	37.0	44.2	43.9	43.4	47.3	50.3	51.0	54.6	57.9

Death Rates from Cancer

In 1912 there were reported as occurring in this State 8,234 deaths from cancer, an increase of over 300 over 1911. The State death rate from cancer was 86.0 per 100,000 of population and to this cause was attributed 5.8 per cent. of all deaths recorded. The urban rate for cancer and other malignant tumors for 1912 was 83.6, the rural rate was 92.8.

It must be borne in mind that this last distribution of the cancer death rate is subject to correction, for it is well known that many life-long residents of rural districts are reported as dying from cancer in a city hospital. If such deaths were credited to the rural districts from which the deceased came, the rural death rate from cancer would be still greater than the urban rate. One reason for this is that there are more people past middle age

Death rates

COU
Greene
Hamilton
Herkimer
Jefferson
Lewis
Livingston
Madison
Monroe
Montgomery
Nassau
New York, Grea
Niagara
Oneida
Onondaga
Ontario
Orange
Orleans
Oswego
Otsego
Putnam
Rensselaer
Rockland
St. Lawrence
Saratoga
Schenectady
Schoharie
Schuyler
Seneca
Steuben
Suffolk
Sullivan
Tioga
Tompkins
Ulster
Warren
Washington
Wayne
Westchester
Wyoming
Yates

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living in the country than in the cities, and deaths fr[illegible] occur mostly in those past middle life.

The distribution of the total deaths from cancer ac[illegible] the part affected was as follows: Cancer of mouth, 2[illegible]; of stomach and liver, 3,005; cancer of peritoneum, intes[illegible] rectum, 1,[illegible]; cancer of skin, 255; cancer of breast, 749; of female genital organs, 1,207; cancer of other or uns[illegible] organs, 1,457.

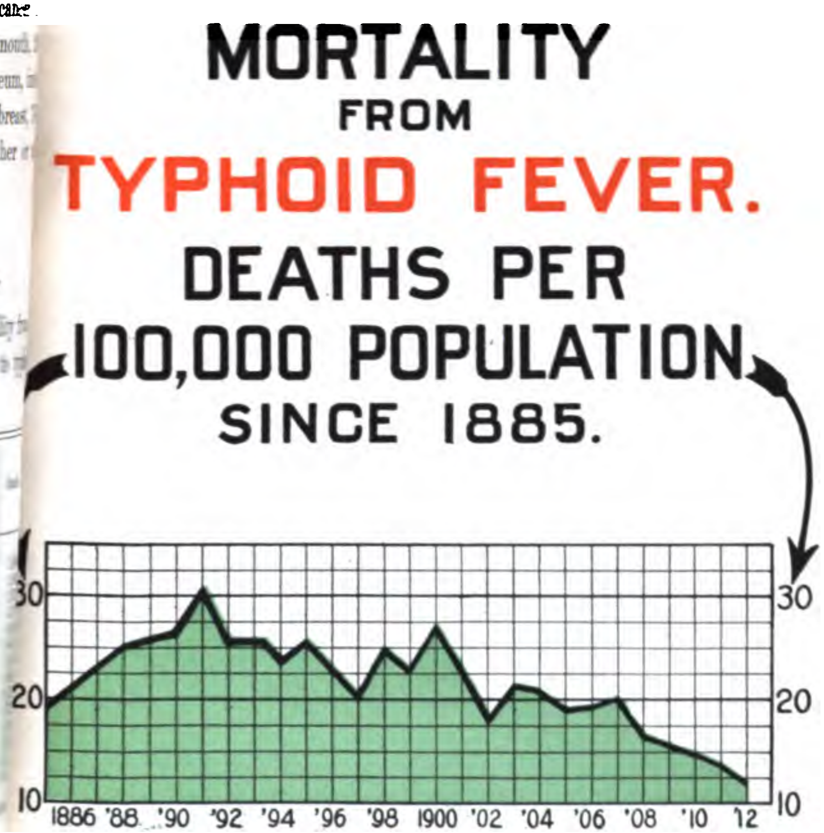
TABLE 85

Mortality from Typhoid Fever

The following table shows the reported mortality from t[illegible] [illegible] and deaths per 100,000 population due to typhoid [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	Deaths	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ties, and dea
life
from canc
cancer of mouth
of peritoneum,
cancer of breast,
cancer of other



NEW YORK STATE DEPARTMENT OF HEALTH

living in the country than in the cit
occur mostly in those past middle li

The distribution of the total deatl
the part affected was as follows: Ca
of stomach and liver, 3,065; cancer o
rectum, 1,211; cancer of skin, 255; c
of female genital organs, 1,207; car
organs, 1,457.

TABLE 3

Mortality from Typ

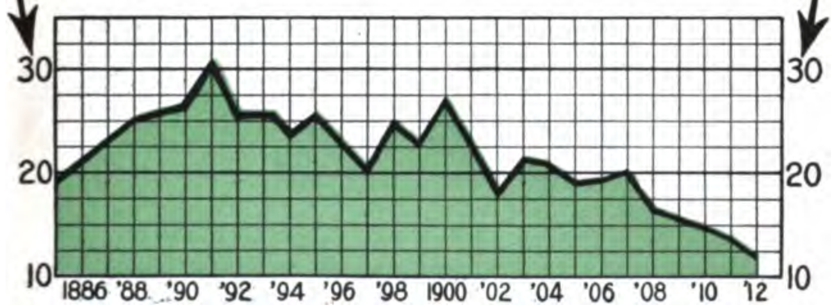
The following table shows the repo
fever and deaths per 100,000 popu
1885:

YEAR	Deaths	Deaths per 100,000 population	
1885	1,067	19.0	1899.
1886	1,169	20.4	1900.
1887	1,327	22.7	1901.
1888	1,483	24.9	1902.
1889	1,550	25.6	1903.
1890	1,612	26.1	1904.
1891	1,926	30.5	1905.
1892	1,664	25.8	1906.
1893	1,685	25.7	1907.
1894	1,640	24.7	1908
1895	1,716	25.4	1909
1896	1,542	22.6	1910
1897	1,351	19.4	1911
1898	1,810	25.6	1912

TABLE 36 —*Deaths from Typhoi*
lation in the

DISTRICTS	1903	1904	1905	1906
Maratime	16.8	17.0	16.2	15.2
Hudson Valley	25.4	35.1	28.4	26.1
Adirondack and Northern	27.8	31.5	26.7	27.9
Mohawk Valley	23.4	19.4	18.4	19.4
Southern Tier	25.5	21.2	17.5	27.9
East Central	17.1	19.4	16.9	14.1
West Central	36.7	20.5	18.6	19.4
Lake Ontario and Western	30.4	24.5	25.2	25.8
Entire State	21.5	20.9	19.2	19.0

MORTALITY
FROM
TYPHOID FEVER.
DEATHS PER
100,000 POPULATION
SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

TABLE 38

CITY	Average rate per 100,000 for ten years	1910 Total deaths	1910 Death rate per 100,000 population	1911 Total deaths	1911 Death rate per 100,000 population	1912 Total deaths	1912 Death rate per 100,000
Cities using unfiltered lake water:							
Auburn	22.5	3	8.6	2	7.9	4	11
Buffalo	27.0	78	18.3	108	25.0	50	11
Dunkirk	39.5	4	23.1	3	16.9	3	16
Geneva	25.8	3	24.1	6	48.0	4	31
Lackawanna	*	1	6.8	1	6.8	1	6
Rochester	13.7	30	13.7	24	10.5	27	11
Syracuse	14.8	38	27.5	22	15.4	24	16
Cities using unfiltered river water:							
Cohoes	83.8	19	76.8	27	108.5	12	48
Lockport	51.5	2	11.1	4	22.0	3	16
Niagara Falls	129.1	30	97.9	59	187.0	23	71
North Tonawanda	34.1	5	41.6	12	96.7	3	23
Ogdensburg	48.5	6	37.5	5	30.8	6	36
Oswego	49.8	12	51.2	3	12.7	5	21
Rome	21.7	4	19.3	[illegible]	9.4	5	22
Tonawanda	31.5	3	36.1	4	47.6	2	23
Cities using filtered river water:							
Albany	21.9	15	14.9	18	17.8	18	17.
Binghamton	20.9	6	12.4	2	4.0	9	17.
Elmira	41.0	10	26.9	5	13.3	6	15.
Poughkeepsie	46.3	5	17.8	4	14.0	4	13.
Rensselaer	54.2	3	28.0	2	18.7	1	9.
Watertown	67.2	24	89.6	10	37.0	3	10.
Watervliet	47.6	7	46.4	11	72.3	5	32.
Cities using well or spring water:							
Corning	44.9	8	58.2	3	21.7	8	57.
Cortland	26.0	9	78.1	4	34.5	3	25.
Fulton	30.7	1	9.5	4	36.7	2	17.
Ithaca	52.8	5	33.7	4	26.9	3	20.
Olean	18.5	0	0	2	13.2	0	
Jamestown	26.6	9	28.5	12	36.8	4	11.
Schenectady	22.4	5	6.8	4	5.2	3	3.

* Incorporated in 1909 from part of town of West Seneca.

TABLE 38 — (*Concluded*)

CITY	Average rate per 100,000 for ten years	1910 Total deaths	1910 Death rate per 100,000 population	1911 Total deaths	1911 Death rate per 100,000 population	1912 Total deaths	1912 Death rate per 100,000 population	Source of water supply
Cities using unfiltered water from streams and reservoirs:								
Amsterdam	18.6	7	22.1	3	9.6	4	11.5	Hans creek, McQueen creek and Steel creek with large reservoirs.
Glens Falls	35.7	2	13.1	1	6.5	4	25.8	Kernan, Wilkie and Butler brooks and storage reservoirs.
Gloversville	19.4	2	9.6	2	9.5	3	13.9	Small streams and storage reservoirs.
Johnstown	17.1	1	9.5	0	0	0	0	Springs and small streams.
Newburgh	39.5	12	43.1	12	42.8	12	42.1	Silver stream and Washington lake and storage reservoir.
New Rochelle	22.8	1	3.4	2	6.4	3	9.1	Troublesome brook and storage reservoirs. Small quantity from wells at times.
Plattsburg	21.2	3	26.8	0	0	3	25.8	Sandburn brook and reservoirs.
Troy	44.9	15	19.5	19	24.7	14	18.2	Small lakes and Tomhannock creek. Sun Kanwissia creek, Deep kill, Quaker kill. Partial use of Hudson river discontinued May, 1906.
Utica	17.3	5	6.7	8	10.3	5	6.3	Small surface streams. Sylvan Glen, Cascade brook, Starch Factory creek, Crow Hill brook.
Port Jervis	43.6	6	64.5	0	0	4	41.8	Surface ponds and streams supplemented by Neversink river.
New York (Greater)	17.0	558	11.6	545	11.0	499	9.8	The sources of supply for the different boroughs of Greater New York are as follows: Boroughs of Manhattan and the Bronx obtain their water from streams, lakes, ponds and reservoirs on the Croton, Bronx and Byram watersheds. Borough of Brooklyn, about 60 per cent. of the water is underground water or is filtered through artificial filters; the remainder is surface water from streams and storage reservoirs. Borough of Queens water supply is underground water from driven wells. Borough of Richmond obtains underground water from wells.
Little Falls	34.3	1	8.1	3	24.0	1	7.8	Surface water from Beaver and Spruce creeks. (Filter abandoned.)
Oneida	14.5	4	48.1	1	12.0	1	12.0	Springs and small streams.
Cities using filtered water from streams and reservoirs:								
Hornell	23.3	5	36.6	2	14.6	1	7.2	Seeley creek. Filtered since 1899. (Mechanical pressure filter.)
Hudson	53.8	6	52.3	0	0	3	25.2	Hudson river, filtered prior to February, 1905. Taghkanick creek and other small streams filtered since then. (Slow sand filter.)
Kingston	19.5	5	19.2	7	26.9	5	19.0	Saw Kill creek and Cooper lake filtered. (Mechanical filter.)
Middletown	24.2	4	26.1	9	59.1	4	26.4	Monhagen, Highland and Shawangunk reservoirs filtered. (Mechanical gravity and pressure filters.)
Mount Vernon	14.8	3	9.6	6	18.5	4	11.9	Mamaroneck and Hutchinson rivers filtered. (Mechanical filter and sand strainer.)
Oneonta	43.0	2	20.9	3	30.4	2	19.7	Oneonta creek filtered. (Mechanical pressure filters.)
Yonkers	9.5	15	18.6	8	9.5	7	7.9	Sprain brook, Grassy Sprain brook, Nepperhan river and storage reservoirs unfiltered, tube wells and Sawmill river, which is filtered. (Slow sand filtration.)
Whole State	19.9	1,374	15.0	1,310	13.9	1,128	11.8	Urban rate, 1910—14.8; 1911—14.3; 1912—11.4. Rural rate, 1910—15.5; 1911—13.0; 1912—12.7.

Reduction in Typhoid Fever Rates Resulting
Water Supplies

That the public health of a community is l
upon the purity of its public water supplies har
stration in the present day of enlightenment in
Furthermore, that of all so-called communic
typhoid fever death rate has by experience
best index of this relation, at least in Am
especially when the rates are in excess of a certa
to the fact, however, that typhoid fever is trace
than impure water, and that contamination of s
of progressive occurrence, this relationship, a
students of vital statistics, does not readily nc
in the table or charts of typhoid fever rates oi
ing public water supplies which are or have
tamination. It is of considerable interest the
to find examples or illustrations in actual pra
relationship, especially where improvements
fecting the sanitary quality of the water.

The State Department of Health has for s
been actively engaged in a campaign for
through the State. Although hindered grea
and lack of direct control over public wat
means of investigations, reports and educati
strong and effective pressure to bear upon
improving the quality of their supplies.
borne fruits will be seen from the follov
typhoid fever rates in certain cities of t
recent years the engineering division has
this direction.

Accompanying the typhoid statistics f
a brief statement of the essential facts
the sanitary quality of the supply. Thi
marked clearness in nearly all cases, the
rates corresponding to the improvemen
responsible for them. If the data were
would be all the more apparent. Furtl
taken as a class and the typhoid rate

a most convincing picture is presented of not only the relationship referred to but as to what can be accomplished in a practical way in the lowering of typhoid fever rates through improvements in the sanitary quality of public water supplies, along inductive lines carried out by the Department.

Typhoid Fever Rates

ALBANY	1900-5	1906	1907	1908	1909	1910	1911	1912
Typhoid rate (per 100,000)......	24.8	20.3	20.0	10.9	18.8	14.9	17.8	17.8

Water filtered since 1899 prior to which typhoid rate was over 80. Preliminary filters installed in 1910. Hypochlorite used at intervals during past three years. Note a great reduction but not marked decline since filters were installed.

AMSTERDAM	1900-5	1906	1907	1908	1909	1910	1911	1912
Typhoid rate (per 100,000)......	22.2	24.8	15.9	0	11.9	22.1	9.0	11.6

In 1908 Department ordered city to inspect watershed, resulting in removal of violations. In 1910 as a result of Department's recommendations, one polluted watershed abandoned. Note general but irregular decline in rate since 1906.

AUBURN	1900-5	1906	1907	1908	1909	1910	1911	1912
Typhoid rate (per 100,000)......	23.8	12.1	6.0	46.6	17.5	8.6	7.9	11.2

In 1906 rules and regulations protecting supply were enacted by Department, since which time orders have been issued to local boards covering 170 violations. Water board maintains active sanitary patrol. In 1908 special orders were issued to the water board to remove all violations. With exception of 1908 note reduction and general low rate since 1905.

BINGHAMTON	1900-5	1906	1907	1908	1909	1910	1911	1912
Typhoid rate (per 100,000)......	25.6	9.1	18.2	15.2	13.1	12.4	4.0	17.8

Water supply filtered since 1902, prior to which rate exceeded 50. Note as with case of Albany, great reduction but no marked decline since filters were installed.

COHOES	1900-5	1906	1907	1908	1909	1910	1911	1912
Typhoid rate (per 100,000)......	92.9	57.8	78.2	62.0	82.2	76.8	108.5	48.0

In February, 1908, the Mohawk river pollution investigation pointed out high typhoid fever rates and necessity for improved supply. In June, 1908, full investigation was made of water in connection with city investigation and water filtration was strongly urged. In 1911 filter plant was installed. Note reduction in rate in 1912.

ELMIRA	1900-5	1906	1907	1908	190
Typhoid rate (per 100,000)......	45.5	44.7	28.0	30.7	33.

In 1896 as result of serious epidemic, filtratio
In 1909 investigation by Department showed co
and recommendations made to abandon local v
efficiency of plant. Operation improved since
chlorite used during past two years. Note redu
1909.

LOCKPORT	1900-5	1906	1907	1908	1
Typhoid rate (per 100,000)......	47.8	67.6	50.1	60.7	4

In 1906 as result of outbreak of typhoid fev
recommended abandonment of polluted Erie ca
1909 the supply has been taken from Niaga
Department recommended filtration. Note red
1909.

MIDDLETOWN	1900-5	1906	1907	1908
Typhoid rate (per 100,000)......	24.1	18.8	18.8	42.1

Mechanical filter plant installed in 1900 an
Hypochlorite used recently. In 1908 Depa
to inspect and remove violations on watershe
of typhoid due to milk indicated high typho
in part to other causes than water.

NEW YORK	1900-5	1906	1907	1908
Typhoid rate (per 100,000)......	18.6	15.5	17.4	12.8

Prior to 1907 practically no violations re
ment for a number of years. Since 1907 s
water rules examined into and necessary
partment to local health boards. Since 19
patrol of watershed and during past two y
in use. Note marked decline since 1907.

NIAGARA FALLS	1900-5	1906	1907	19
Typhoid rate (per 100,000)......	141.5	154.5	126.0	87

An investigation of the sanitary con
Niagara Falls was carried on by the engi
the summer of 1907, following which th
urged a new or a filtered supply. In
investigation, public warned of danger o
filters installed, with hypochlorite treat
duction in rate in 1912 as result of filtra

TABLE 39

Mortality from Diphtheria

The reported mortality from Diphtheria since 1885 and per 100,000 population is shown by the following:

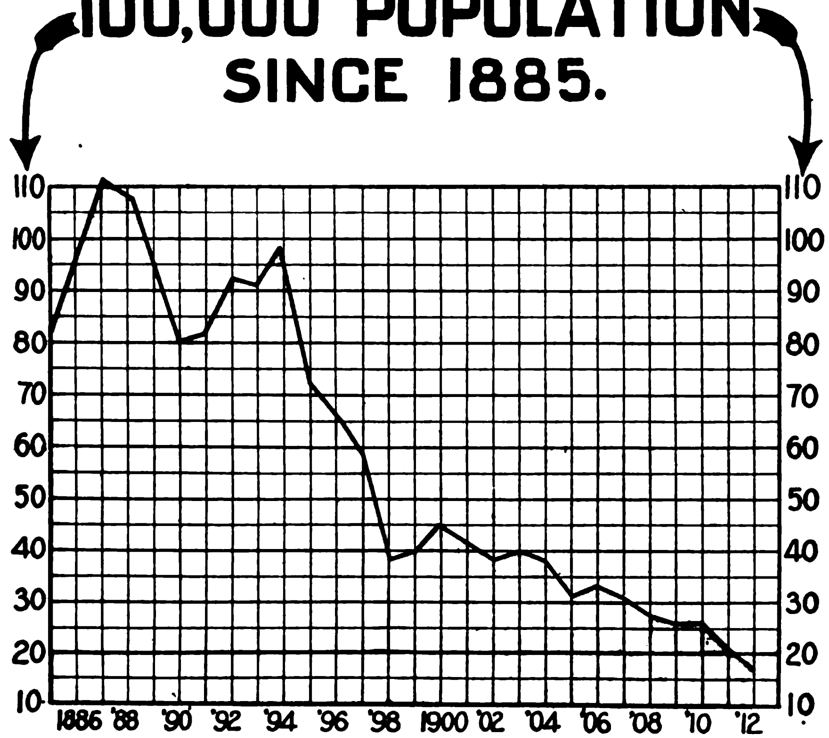
YEAR	Deaths from diphtheria	Deaths per 100,000 population due to diphtheria	YEAR	Deaths from diphtheria
1885	4,508	80.3	1899	2,78
1886	5,597	97.8	1900	3,30
1887	6,490	111.3	1901	3,0
1888	6,448	108.4	1902	2,8
1889	5,885	96.9	1903	3,0
1890	4,915	79.5	1904	3,
1891	5,072	80.3	1905	2,
1892	5,918	91.9	1906	2,
1893	5,947	91.0	1907	2
1894	6,592	99.3	1908	2
1895	4,989	74.0	1909	2
1896	4,597	67.1	1910	
1897	4,115	59.2	1911	
1898	2,612	37.0	1912	

The following shows the total deaths and d
diphtheria in 5-year periods since 1885:

FIVE-YEAR PERIODS	Yearly average
1885-1889	5,7
1890-1894	5,6
1895-1899	3,
1900-1904	3,
1905-1909	2,
1910-1912	2

Diphtheria has decreased steadily from 5
mortality to 1 per cent; from 100 deaths p
yearly to 22, likewise about one-fifth. Th
of the more effective means for control of
hand since 1885, is the greatest in any
of death. The actual mortality is now on
twenty-five years ago.

MORTALITY
FROM
DIPHTHERIA.
DEATHS PER 100,000 POPULATION SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

TABLE 40 — *Deaths from Diphtheria per* 100,000 *population in the —*

DISTRICTS	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Maritime	54.6	51.3	37.5	43.5	39.7	38.8	37.0	34.2	24.9	21.6
Hudson Valley	19.4	23.2	21.1	22.9	31.6	21.6	14.4	16.7	14.7	12.0
Adirondack and Northern	14.1	16.0	10.2	16.3	16.2	12.7	7.6	11.3	6.1	4.2
Mohawk Valley	22.5	24.6	15.6	25.4	17.4	15.6	11.3	16.4	13.4	7.7
Southern Tier	17.2	23.5	16.1	13.7	20.0	14.1	15.8	12.1	10.7	6.1
East Central	12.2	14.3	8.6	10.5	15.2	19.1	10.0	12.0	14.7	12.2
West Central	12.6	15.2	11.7	8.4	15.0	10.9	7.8	5.3	8.4	8.4
Lake Ontario and Western	34.5	32.7	25.5	26.4	19.1	11.0	17.6	24.0	24.6	14.4
Entire State	39.2	38.4	28.4	32.6	30.9	28.9	26.6	26.6	20.9	11.6

TABLE 41 — *In each* 1,000 *deaths there were from Diphtheria in the —*

DISTRICTS	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Maritime	31	26	21	24	21	23	22	22	16	15
Hudson Valley	12	13	12	13	17	13	9	10	8	7
Adirondack and Northern	10	11	7	11	11	9	5	7	4	3
Mohawk Valley	16	15	11	15	10	10	7	10	9	5
Southern Tier	14	19	11	9	13	9	10	8	7	4
East Central	9	9	6	7	10	7	6	7	9	8
West Central	8	10	7	5	9	7	5	4	5	5
Lake Ontario and Western	22	22	17	17	12	12	12	16	17	10
Entire State	24	21	17	19	18	18	16	17	14	11

TABLE 42

Scarlet Fever and Measles

The reported mortality from scarlet fever and measles, and deaths per 100,000 population, are shown by the following:

YEAR	Deaths from scarlet fever	Deaths per 100,000 population from scarlet fever	YEAR	Deaths from measles	Deaths per 100,000 population from measles
1885	1,184	21.1	1885	1,170	20.8
1886	1,011	17.7	1886	895	15.6
1887	1,267	21.7	1887	1,205	20.7
1888	2,452	41.2	1888	944	15.9
1889	2,205	36.4	1889	899	14.8
1890	913	14.8	1890	1,161	18.8
1891	2,252	35.6	1891	1,200	19.0
1892	2,177	33.8	1892	1,350	20.9
1893	1,626	24.8	1893	789	12.1
1894	1,227	18.8	1894	900	13.5
1895	850	12.6	1895	1,266	18.8
1896	759	11.1	1896	1,495	21.8
1897	841	12.1	1897	873	12.5

TABLE 42 — *Scarlet Fever and Me*

YEAR	Deaths from scarlet fever	Deaths per 100,000 population from scarlet fever	YE
1898	837	11.8	1898
1899	730	10.2	1899
1900	689	9.4	1900
1901	1,430	19.2	1901
1902	1,215	16.0	1902
1903	1,057	13.6	1903
1904	1,194	15.1	1904
1905	726	9.0	1905
1906	690	8.4	1906
1907	1,032	12.2	1907
1908	1,688	19.8	1908
1909	1,205	14.0	1909
1910	1,617	17.6	1910
1911	1,149	12.3	1911
1912	789	8.2	1912

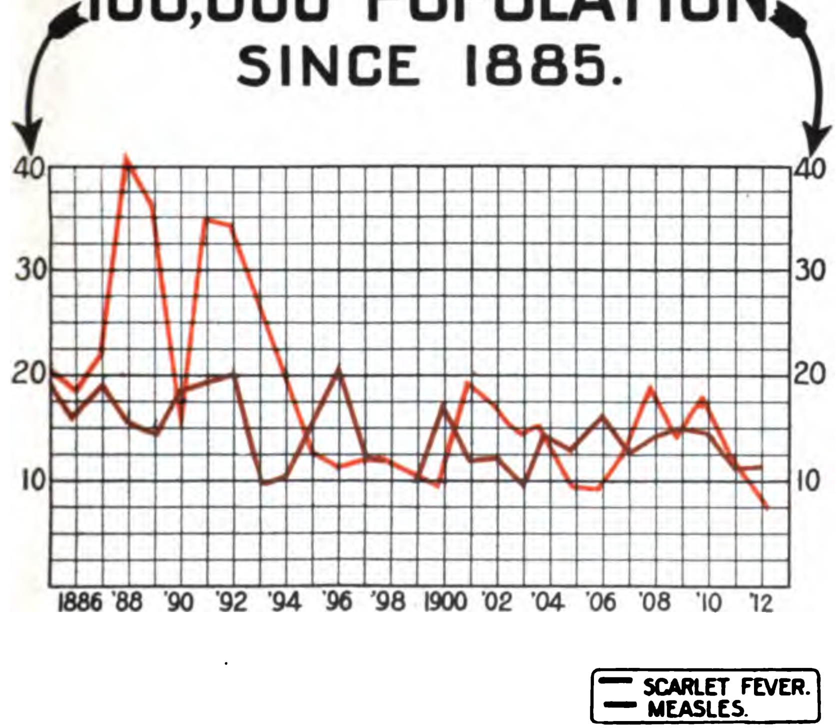
TABLE 43 —*In each 1,000 deaths the*
in the —

DISTRICTS	1903	1904	1905	1906	190
Maritime	10	11	6	6	
Hudson Valley	7	3	4	1	
Adirondack and Northern	4	5	2	2	
Mohawk Valley	11	11	6	7	
Southern Tier	5	9	3	1	
East Central	2	6	9	4	
West Central	1	1	2	2	
Lake Ontario and Western	6	2	5	4	
Entire State	8	8	5	5	

TABLE 44 —*In each 1,000 deaths t*
the —

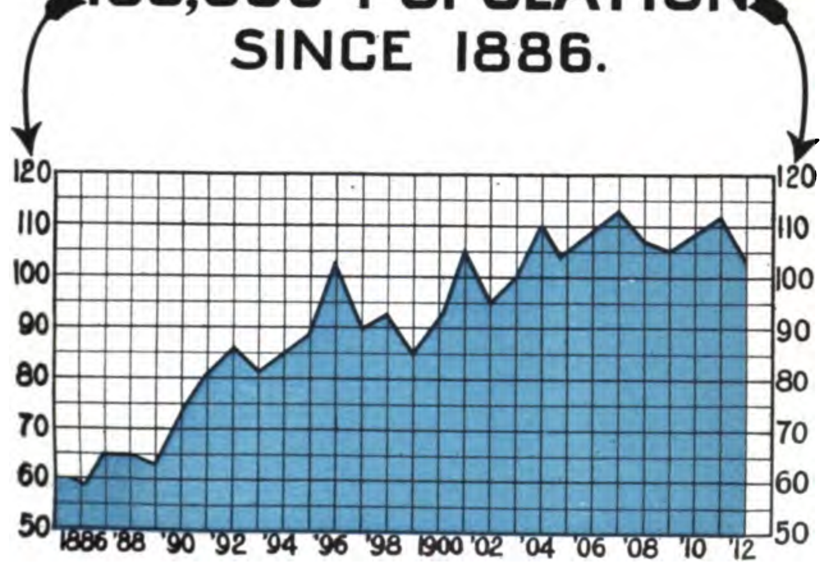
DISTRICTS	1903	1904	1905	1906	19
Maritime	7	11	7	14	
Hudson Valley	3	8	9	5	
Adirondack and Northern	3	1	11	3	
Mohawk Valley	3	2	5	1	
Southern Tier	2	9	2	1	
East Central	5	4	4	3	
West Central	3	3	4	3	
Lake Ontario and Western	6	3	11	4	
Entire State	9	10	8	10	

MORTALITY
FROM
SCARLET FEVER AND MEASLES.
DEATHS PER 100,000 POPULATION SINCE 1885.



NEW YORK STATE DEPARTMENT OF HEALTH

MORTALITY
FROM
VIOLENCE.
DEATHS PER
100,000 POPULATION
SINCE 1886.



NEW YORK STATE DEPARTMENT OF HEALTH

TABLE 45

Deaths from Violence

The reported mortality from Violence and deaths per 100,000 population due to accidents is shown by the following:

YEAR	Deaths from violence	Deaths per 100,000 population	YEAR	Deaths from violence	Deaths per 100,000 population
1885	2,994	53.3	1899	6,093	85.0
1886	3,296	57.6	1900	6,714	92.2
1887	3,780	64.7	1901	7,926	106.6
1888	3,842	64.6	1902	7,058	93.0
1889	3,831	63.2	1903	7,646	98.6
1890	4,542	73.4	1904	8,822	111.5
1891	5,028	79.6	1905	8,352	103.3
1892	5,543	86.1	1906	8,874	107.5
1893	5,295	80.9	1907	9,668	114.2
1894	5,487	82.7	1908	9,183	107.4
1895	5,889	87.3	1909	9,232	106.1
1896	7,022	102.6	1910	9,846	107.5
1897	6,172	88.7	1911	10,575	112.8
1898	6,520	92.4	1912	9,904	103.2

TABLE 46 —*In each 1,000 deaths there were from Violence in the —*

DISTRICTS	Decade 1895–1904	1905	1906	1907	1908	1909	1910	1911	1912
Maritime	57.7	53.5	63.1	66.4	69.0	65.4	64.5	72.0	68.0
Hudson Valley	49.3	64.6	58.3	60.3	61.9	70.0	74.1	72.8	68.0
Adirondack and Northern	46.2	52.3	56.1	54.0	60.4	53.7	58.3	63.3	66.1
Mohawk Valley	53.1	58.8	60.9	61.5	60.4	68.4	67.6	72.8	74.6
Southern Tier	55.5	67.0	59.4	63.3	62.7	66.9	70.6	77.0	74.6
East Central	50.0	54.5	60.9	63.7	62.1	61.5	67.8	75.0	69.4
West Central	51.7	58.0	63.6	63.3	64.1	65.8	65.7	70.6	69.6
Lake Ontario and Western	57.0	66.2	74.2	71.2	63.1	73.4	62.8	76.4	75.2
Entire State	55.8	61.0	63.2	65.3	66.1	65.8	65.0	72.5	69.5

TABLE 47 — *In each 1,000 deaths there were from Diarrhea (under 2 years of age) in the —*

DISTRICTS	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Maritime	85	75	76	83	74	79	81	69	74	60	54
Hudson Valley	42	35	36	43	35	20	43	35	39	32	31
Adirondack and Northern	33	38	23	43	34	35	45	39	40	31	27
Mohawk Valley	44	35	40	41	44	47	53	50	64	43	60
Southern Tier	34	35	23	29	37	25	34	22	32	21	26
East Central	33	28	20	32	36	37	41	35	44	26	28
West Central	35	26	26	35	36	22	30	26	33	26	24
Lake Ontario and Western	56	50	53	50	57	46	52	48	54	58	70
Entire State	67	60	60	65	61	63	66	56	61	50	67

TABLE 48 —*In each 1,000 deaths there we*
in the —

DISTRICTS	1903	1904	1905	1906	1907	1
Maritime	89	110	125	137	78	
Hudson Valley	70	78	75	79	77	
Adirondack and Northern	57	60	66	74	81	
Mohawk Valley	64	73	77	76	80	
Southern Tier	55	70	70	60	71	
East Central	64	83	75	61	66	
West Central	60	72	70	65	65	
Lake Ontario and Western	51	65	65	60	54	
Entire State	80	95	104	109	75	

TABLE 49

Infant Mortality (Whole Stat

The following tables show the mortality am(five and infants under one year of age, and al deaths at all ages and in their relation to the t

Year	Total mortality	Mortality under five years	Under one year*	Total births	Annua number deaths under o year t(1,000 livi births
1885	80,407	30,027	....	63,536	....
1886	86,801	32,928	....	89,828	....
1887	108,269	35,114	....	102,038	....
1888	114,584	38,345	....	103,089	....
1889	113,155	40,243	....	114,804	....
1890	128,648	37,392	....	112,572	....
1891	129,850	42,740	....	125,909	....
1892	131,388	42,434	....	130,143	....
1893	129,659	41,643	....	136,297	....
1894	123,433	41,472	....	141,827	....
1895	128,834	42,002	....	142,311	....
1896	126,253	40,136	....	147,327	....
1897	118,525	35,771	....	144,631	....
1898	122,584	37,113	....	138,702	....
1899	121,831	35,386	....	136,778	....
1900	132,089	39,204	....	143,156	....
1901	131,335	35,775	....	140,539	....
1902	124,830	31,215	....	146,740	....
1903	127,498	32,768	....	158,343	....
1904	142,217	†14,177	24,909	165,014	151.0
1905	137,435	12,218	25,827	172,259	150.0
1906	141,099	12,176	27,114	183,012	148.1
1907	147,130	12,157	28,011	196,020	142.9
1908	138,912	11,380	26,561	203,159	130.7
1909	140,261	12,201	26,077	202,656	128.6
1910	147,710	12,314	27,534	213,235	129.1
1911	145,912	10,840	25,316	221,678	114.2
1912	142,377	10,106	24,681	227,120	108.7

* Until 1904, deaths under one year were not classified separately.
† Mortality one to five years.

TABLE 50

Relative Area, Density of Population and Death Rates in the Sanitary Districts for 1911 *and* 1912

DISTRICTS	Area in square miles (land)	Population per square mile, 1912	URBAN DEATH RATE		RURAL DEATH RATE		TOTAL DEATH RATE		PERCENTAGE OF DEATHS: UNDER 1 YEAR		PERCENTAGE OF DEATHS: BETWEEN 1 AND 5 YEARS		PERCENTAGE OF DEATHS: AT 60 YEARS AND OVER		PERCENTAGE OF DEATHS: FROM EPIDEMIC DISEASES	
			1911	1912	1911	1912	1911	1912	1911	1912	1911	1912	1911	1912	1911	1912
Maritime	1,946	2,884	15.2	14.3	16.3	16.1	15.2	14.3	19.6	19.3	9.3	9.0	23.7	24.1	6.2	5.1
Hudson Valley	5,679	130	20.0	19.0	16.2	14.7	18.0	16.7	13.2	13.1	4.6	4.7	41.4	42.4	6.2	5.0
Adirondack and Northern	13,358	30	18.9	18.8	15.3	14.1	16.0	14.9	14.2	13.7	4.0	3.1	46.1	47.8	6.2	4.2
Mohawk Valley	5,179	97	16.2	16.1	15.2	14.9	15.7	15.5	15.7	16.8	5.0	5.2	42.1	41.2	5.3	4.1
Southern Tier	6,419	72	15.5	14.9	16.5	15.9	16.1	15.5	11.8	10.9	3.5	3.3	51.8	52.0	6.1	3.9
East Central	6,252	70	14.7	16.1	16.4	16.1	15.7	16.1	13.0	13.0	4.2	3.3	48.0	47.8	6.4	4.4
West Central	4,588	70	17.2	16.4	16.3	16.1	16.5	16.2	10.3	10.1	3.6	3.9	53.0	54.0	5.5	5.0
Lake Ontario and Western	4,190	264	14.9	14.9	14.3	14.3	14.7	14.7	17.1	13.4	6.3	6.1	35.4	34.7	6.5	4.8
Entire State	47,620	202	15.5	14.7	15.8	15.3	15.5	14.8	17.3	17.3	7.3	7.1	32.2	32.6	6.2	5.1

TABLE 51

Infant Mortality, 1912 *(Outside Cities of Greater New York and Buffalo)*

Deaths by Causes

CAUSE OF DEATH	AGE, UNDER 1 YEAR, IN COMPLETED DAYS, WEEKS, OR MONTHS								
	Under 1 year	DAYS: Under 1	DAYS: 1	DAYS: 2	DAYS: 3 to 6	WEEKS: Under 1	WEEKS: 1	WEEKS: 2	WEEKS: 3
	8,967	*1,350*	*570*	*291*	*604*	*2,815*	*524*	*405*	*324*
Measles	*79*				1	*1*	1		1
Scarlet fever	*7*							1	
Whooping cough	*207*						1	7	11
Diphtheria and croup	*27*							3	1
Influenza	*50*							3	6
Dysentry	*14*								1
Erysipelas	*41*							4	5
Tetanus	*11*				2	*2*	7		
Tuberculosis of the lungs	*33*								
Tuberculous meningitis	*61*								
Other forms of tuberculosis	*26*		1			*1*	1		
Syphilis	*77*	4	1		3	*8*	11	8	4
Meningitis	*141*		2	5	8	*15*	1	3	3
Convulsions	*280*	13	18	19	47	*97*	29	19	22
Organic diseases of the heart	*71*	1	1	7	10	*19*	6	7	1
Acute bronchitis	*286*				8	*8*	20	20	18
Pneumonia	*410*		1	4	15	*20*	21	20	9
Bronchopneumonia	*568*		2	2	7	*11*	20	21	20
Diseases of the stomach	*88*			3	1	*4*	3	2	2
Diarrhea and enteritis	*2,104*	2	2	4	19	*27*	65	82	65
Malformations	*539*	129	66	45	83	*323*	49	27	15
Premature birth	*1,628*	728	300	105	190	*1,323*	130	63	44
Congenital debility	*1,210*	203	87	37	110	*437*	83	81	70
Injuries at birth	*376*	227	62	35	33	*357*	10	2	
External causes	*71*	9	6	1	4	*20*	6	3	4
Ill-defined and unknown	*36*	1	3		3	*7*			1
All other causes	*621*	33	18	24	60	*135*	60	29	21

TABLE 51 — *Infant Mortality,* 1912 —

CAUSE OF DEATH	AGE, UNDER 1 YEA WEEKS,			
	M			
	Under 1	1	2	3
	1,253	*861*	*749*	[illegible]
Measles	*2*	3	6	
Scarlet fever	*1*	.....	.....	
Whooping cough	*19*	29	21	
Diphtheria and croup	*4*	.....	.....	
Influenza	*9*	8	4	
Dysentery	*1*	.....	1	
Erysipelas	*9*	13	3	
Tetanus	*7*	1	.....	..
Tuberculosis of the lungs	.....	.....	5	
Tuberculous meningitis	.....	3	1	
Other forms of tuberculosis	*1*	6	3	
Syphilis	*23*	20	8	
Meningitis	*7*	10	12	
Convulsions	*70*	27	26	
Organic diseases of the heart	*14*	9	5	
Acute bronchitis	*58*	47	37	
Pneumonia	*60*	50	49	
Bronchopneumonia	*61*	69	66	
Diseases of the stomach	*7*	7	4	
Diarrhea and enteritis	*212*	249	261	[illegible]
Malformations	*91*	42	24	
Premature birth	*237*	43	15	
Congenital debility	*234*	178	148	[illegible]
Injuries at birth	*12*	2	.....	
External causes	*13*	9	6	
Ill-defined and unknown	*1*	1	1	
All other causes	*110*	35	43	

TABLE 52

Infant Mortality in the Cities

CITY	Estimated population 1912	Total deaths 1912	Death rate 1912	Death rate 1911	Total living births 1912	Birth rate 1912	Birth rate 1911
New York	5,114,090	73,019	14.3	15.2	135,581	26.5	27.1
Borough of Manhattan	2,435,102	36,559	15.0	16.1	66,249	27.3	27.8
Bronx	503,181	6,944	13.8	14.7	13,600	27.0	26.5
Brooklyn	1,760,848	23,994	13.6	14.4	45,454	25.8	26.8
Queens	323,089	3,978	12.3	13.1	8,003	24.8	24.8
Richmond	91,870	1,544	14.7	17.8	2,275	24.8	25.4
Buffalo	444,915	6,527	14.7	14.5	11,591	26.1	24.2
Rochester	234,514	3,371	14.4	15.0	5,524	23.4	23.3
Syracuse	146,133	2,177	14.9	14.3	3,065	21.0	21.2
Albany	101,469	2,046	20.2	20.5	1,918	18.9	13.9
Yonkers	88,132	1,083	12.3	14.3	2,405	27.3	27.1
Schenectady	79,444	1,017	12.8	12.4	1,829	23.0	24.0
Utica	79,297	1,503	19.0	18.7	2,101	26.5	26.9
Troy	77,058	1,520	19.7	21.0	1,329	17.2	16.4
Binghamton	50,864	908	17.9	18.9	1,091	21.5	20.0
Elmira	37,833	554	14.6	15.0	607	16.0	15.6
Auburn	35,637	571	16.0	18.0	715	20.1	17.6
Amsterdam	34,645	493	14.2	13.2	775	22.4	22.3
Jamestown	33,693	399	11.8	12.7	750	22.3	22.5
Mt. Vernon	33,631	401	11.9	12.8	833	24.8	36.4
New Rochelle	32,707	379	11.6	10.9	749	22.9	24.6
Niagara Falls	32,263	544	16.9	18.8	1,132	35.1	33.0
Poughkeepsie	29,199	489	16.7	19.6	703	24.1	22.2
Newburgh	28,478	519	18.2	19.5	553	19.4	19.7
Watertown	27,388	461	16.8	16.6	514	18.8	18.7
Kingston	26,133	481	18.4	19.3	445	17.0	16.4
Cohoes	25,000	440	17.6	19.3	638	25.5	18.8
Oswego	23,814	383	16.1	15.2	457	19.2	21.4
Rome	21,931	488	22.3	23.2	548	25.0	24.2
Gloversville	21,576	306	14.2	15.9	383	17.8	17.1
Lockport	18,215	291	16.0	17.4	316	17.3	17.6
Dunkirk	18,137	227	12.5	15.1	504	27.8	34.3
White Plains, village	17,892	256	14.3	17.2	450	25.2	24.7
Ogdensburg	16,439	459	27.9	24.5	364	22.1	22.2
Peekskill, village	16,170	191	11.8	16.4	302	18.7	22.4
Lackawanna	16,011	410	25.6	26.1	556	34.7	31.7
Glens Falls	15,510	235	15.2	19.3	306	19.7	21.4
Olean	15,496	215	13.9	13.8	378	24.4	23.4
Watervliet	15,341	269	17.5	17.3	284	18.5	15.0
Middletown	15,147	374	24.7	25.6	309	20.4	17.4
Ithaca	14,940	231	15.5	19.2	252	16.9	15.2
Corning	13,861	235	17.0	13.5	260	18.7	20.0
Hornell	13,830	203	14.7	15.5	228	16.5	14.1
Port Chester	13,537	195	14.4	15.5	498	36.8	36.3
Ossining, village	12,886	200	15.5	15.8	179	13.9	17.4
Little Falls	12,831	191	14.9	16.8	391	30.5	28.4
North Tonawanda	12,779	136	10.6	12.6	377	29.5	32.6
Geneva	12,574	213	16.9	12.5	246	19.6	17.6
Saratoga Springs	12,555	272	21.7	21.4	215	17.1	15.9
Batavia, village	12,246	224	18.3	17.6	309	25.2	20.7
Hudson	11,894	211	17.7	18.8	225	18.9	18.9
Cortland	11,643	205	17.6	17.8	238	20.4	20.5
Plattsburg	11,602	181	15.6	16.0	255	22.0	21.1
Fulton	11,230	202	18.0	16.0	291	25.9	21.7
Johnstown	10,755	123	11.4	14.2	161	15.0	18.9
Rensselaer	10,719	152	14.2	13.9	157	14.7	14.6
Oneonta	10,141	162	16.0	17.3	214	21.1	17.3
Port Jervis	9,564	154	16.1	16.9	155	16.2	17.2
Tonawanda	8,464	108	12.8	12.2	156	18.4	21.4
Oneida	8,317	122	14.7	15.2	154	18.5	20.8
Total, Urban	7,260,570	106,726	14.7	15.5	184,966	25.5	25.7
Total, Rural	2,331,688	35,651	15.3	15.8	42,154	18.0	17.4
Entire State	9,592,258	142,377	14.8	15.5	227,120	23.7	23.6

TABLE 52 — *Infant Mortality in the Citie*

CITY	Deaths under 1 year	Deaths 1 year to 5 years	Annual number of deaths under 1 year to 1,000 living births		
			1912	1911	
New York	14,266	6,718	105	112	
Borough of Manhattan	7,661	3,468	115	123	
Bronx	1,112	586	82	87	
Brooklyn	4,455	2,226	98	101	
Queens	784	330	98	109	
Richmond	254	108	112	121	
Buffalo	1,448	424	125	100	
Rochester	539	221	97	110	
Syracuse	411	109	134	126	
Albany	262	87	137	181	
Yonkers	275	101	114	131	
Schenectady	241	77	131	113	
Utica	300	118	143	155	
Troy	207	85	157	181	
Binghamton	125	32	114	107	
Elmira	52	17	85	101	
Auburn	91	35	127	198	
Amsterdam	140	37	181	*129*	
Jamestown	59	22	78	*110*	
Mt. Vernon	79	43	94	73	
New Rochelle	76	52	101	109	
Niagara Falls	145	41	128	163	
Poughkeepsie	73	31	104	127	
Newburgh	66	31	119	120	
Watertown	63	19	122	136	
Kingston	55	18	124	121	
Cohoes	90	26	141	*275*	
Oswego	67	11	146	128	1
Rome	74	26	135	99	1
Gloversville	32	14	84	83	1
Lockport	32	15	101	*110*	*1*
Dunkirk	55	15	109	114	2
White Plains, village	51	25	113	129	2
Ogdensburg	51	14	140	99	1
Peekskill, village	39	18	129	*116*	*2*
Lackawanna	*259	78	466	584	6
Glens Falls	23	7	75	135	1
Olean	40	11	105	102	1
Watervliet	61	18	215	*225*	*22*
Middletown	38	9	123	133	10
Ithaca	16	7	63	88	7
Corning	31	22	119	119	13
Hornell	29	7	127	*125*	*14*
Port Chester, village	62	20	124	115	32
Ossining, village	22	15	123	147	11
Little Falls	44	8	112	137	23
North Tonawanda	52	7	137	102	*38*
Geneva	29	10	118	78	14
Saratoga Springs, village	23	8	107	116	9
Batavia, village	39	18	126	146	18
Hudson	34	14	151	159	*16*
Cortland	17	6	72	130	8
Plattsburg	42	8	165	136	23
Fulton	37	10	127	*148*	*18*
Johnstown	15	3	93	95	*12*
Rensselaer	19	5	121	121	12
Oneonta	26	7	121	137	16
Port Jervis	21	1	135	*132*	*14*
Tonawanda	19	4	121	117	*18*
Oneida	12	5	78	81	10
Total, Urban	20,474	8,790	*111*	*115*	*20*
Total, Rural	4,207	1,316	100	89	12
Entire State	24,681	10,106	108	114	17

* Includes 188 deaths of non-resident infants brought to institutions from most of whom were born in other states. Deducting these deaths it will sh of deaths under one year to living births, to be 127 and the percentage of dea to total deaths 17.3.

The foregoing table shows the total number of reported births and deaths occurring in the State during 1912; deaths under one year of age, and number of deaths under one year to 1,000 living births, also percentage of deaths under one year to total deaths. Still births are not included in the statistics as either a birth or death, but premature births (not still born) are included in the totals under both headings.

A steady and well-marked decrease has been shown from year to year during the past nine years, and a great saving in infant lives during the past three years as is shown by the large decrease in the number of deaths, notwithstanding the great increase in population.

YEAR	Deaths under 1 year	Number of deaths under 1 year to 1,000 living births
1904	24,909	151.0
1905	25,827	150.0
1906	27,114	148.1
1907	28,011	142.9
1908	26,561	130.7
1909	26,077	128.6
1910	27,457	128.7
1911	25,174	113.5
1912	24,659	108.9

It is of interest to note that while the infant mortality throughout the State was 108.9 that of Greater New York was 105. The city of New York is provided with a much larger per capita appropriation for the protection of the health of its inhabitants than that given most of the municipalities up the State, and the State Department of Health receives an appropriation far too small to make its efforts what they should be to assist the local health officials in their work to prevent disease and to protect public health outside of New York City.

The infant mortality statistics show most strikingly that baby health is purchasable. The rural mortality was 15.2 per cent., while the urban death rate was 14.6 per cent. throughout the State, making the rural mortality .6 per cent. greater than the urban. The infant mortality, on the other hand, gives the advantage to the county baby by 1 per cent., the figures being 11.1 per cent. and 10.1 per cent. for the country. It can truthfully be

said that infant mortality is one of the most sensitive signs we possess of the efficiency of Public Health measures.

The months of July, August and September draw a heavy toll on our babies as from one-third to one-half of the baby deaths are recorded during these months. The atmospheric heat and humidity, according to some investigators, are most injurious to babies, as it is now generally accepted that the babies are more subject to heat strokes than adults. One effect of the atmospheric conditions during the summer is to lower the resistive powers of the child and make him more susceptible to digestive and intestinal injuries brought about by unclean milk and faulty feeding.

A great reduction in infant mortality in many of the cities in this State during recent years has been largely due to activities by the local health departments in providing pure, clean milk for general consumption, and in the establishment of infant welfare stations.

THE NEW VITAL STATISTICS LAW

The new Vital Statistics Law (chap. 619 of the Laws of 1913) which goes into effect January 1, 1914, places the registration of births, deaths and still births under the immediate supervision of the State Department of Health and applies to all registration districts in the State outside of the territory comprising Greater New York.

The law was compiled after a most careful study of existing defects in the present registration law, and has the approval of the United States Bureau of Census, the American Public Health Association, the American Medical Association, the American Bar Association, the American Association for the Study and Prevention of Infant Mortality, and is known as the "Model Registration Law," and is generally being adopted by all of the States in the United States, so as to bring about uniform and effective registration of vital statistics throughout the country.

Each town, village and city constitutes a separate registration district, but the State Commissioner of Health may combine two or more primary registration districts to facilitate registration.

In towns the registar will be appointed by the town board, in

Each registrar is required to carefully examine each certificate of birth or death when presented for recording in order to ascertain whether the record is made out in accordance with the provisions of law and instructions of the State Commissioner of Health, and no certificate shall be accepted until properly filled out.

Physicians and midwives are required to file certificates of births attended by them with the local registrar within five days after the birth occurs.

Whenever the certificate of a birth of a living child is filed with the registrar without the given name of the child, the registrar is required to send a supplemental report blank to the parents who shall fill out same, giving the name of the child in full, and file the record with the registrar, as soon as the child is named, and such record shall be entered upon the birth registrar and filed with the original certificate of birth.

All superintendents or managers, or other persons in charge of hospitals, almshouses, lying-in or other institutions, public or private, to which persons resort for treatment of diseases, or confinement, are required to make a record of all of the personal and statistical particulars required in the forms prescribed by the State Department of Health for the registration of births and deaths, and every birth or death occurring in such institutions must be promptly reported by the attending physician.

When deaths occur without medical attendance, and the circumstances of death do not tend to show death due to unlawful act or neglect (in which case the matter should be referred to the coroner), the health officer is required to investigate and certify as to the cause of death.

Undertakers are required to obtain the medical certificate of death from the attending physician and after obtaining the family history and other information necessary to complete the record, over the signature of the informant, file the certificate of death with the registrar of the district in which the death occurred, and obtain a burial or transit permit before removing the corpse for burial.

Physicians are required to use greater care in filling out certificates of death, giving the cause of disease in sequence of causes

resulting in the death. Indefinite terms, denoting only symptoms oi disease or conditions resulting from disease, shall be held insufficient, and local registrars must not issue a burial or transit permit until the physician files a definite and satisfactory statement as to cause of death.

All births and deaths must be reported on blank forms prescribed by the State Commissioner of Health and furnished local registrars by the Department without cost.

Still births are to be reported on regular forms prescribed for births and deaths when the child has advanced to the fifth month of uterogestation. Midwives are not allowed to sign certificates of death for still-born children.

The body of any person whose death occurs in this State, or which shall be found dead therein, shall not be interred, deposited in a tomb vault or tomb, or cremated or otherwise disposed of or removed from or into any registration district, or temporarily held pending further disposition more than seventy-two hours after death, unless a permit for burial, removal or other disposition thereof shall have been properly issued by the registrar of vital statistics of the registration district in which the death occurred or the body was found.

No such burial or removal permit shall be issued by any registrar until, when practicable, a complete and satisfactory certificate of the death has been filed with the registrar. In case death occurred from a communicable disease, no permit for the burial, removal or other disposition of the body shall be issued by the registrar except to an undertaker duly licensed under the provisions of chapter 71 of the Laws of 1913.

The State Commissioner of Health is required to furnish local registrars with a list of diseases which are considered infectious or contagious, so that when a death occurs from such disease proper precautions may be taken to prevent their spread.

Local registrars are required to promptly report to the health officer the name and address of persons reported as having died from tuberculosis (see section 320, chapter 559, Laws of 1913), and the health officer shall immediately ascertain from his records whether the case was properly reported to him before death, as reqnired by law, and if not see that the law is enforced. When

notified of a death or the vacation of any ap by a tuberculosis patient, the health officer such apartments or premises and order and di articles shall be removed therefrom until pr cleansed and disinfected, and all apartment be disinfected, cleansed or remodeled in orde rendered safe and suitable for occupancy.

No person in charge of any premises on cremations are made shall inter or permit th disposition of any corpse unless it is accom cremation or transit permit. They are requi of all bodies interred or otherwise disposed under their charge giving the name of decease death, date of burial or disposal, and name undertaker, which shall at all times be open Where there is a cemetery or burial ground charge, the undertaker is required to file s local registrar within three days after burial

Every physician, midwife and undertaker is his or her name and address with the registr which he or she resides, or may hereafter es At the close of each year the local registrars such list with the State Department of Healt fee is charged.

Under the new law the fee of twenty-five lowed physicians for reporting births and deaths as no fees for such purpose are allowed in having adopted the Model Registration Law, required by law as a part of their profes physicians being protected by law in their pr fession owe it to the State to promptly rep death, as well as cases of communicable di registrar and health officer, to protect the p

Local registrars are entitled to a fee of each birth and death certificate properly filed on their register, if the returns are forwarded partment of Health within five days after the cl and no certificates being recorded during any m

is entitled to a fee of twenty-five cents for reporting such fact to the State Department of Health.

All certified copies of birth and death certificates must be obtained from the State Department of Health, and are to be furnished by the Commissioner of Health upon receipt of a fee of $1 for each record furnished under the law. A fee of fifty cents for each hour or fractional part thereof spent in making searches for records not found on file in the Department, or for which no certified copy is requested, is to be paid by the applicant for such record.

If at any time within ten years of the birth, or one year of the death of any person within this State, a certified copy of the certificate of such birth or death is required, and it shall be found that the original certificate of such record is not on file in the Department, the State Commissioner of Health shall immediately require the physician or midwife who was in attendance and filed or neglected to file the certificate thereof, if he or she be living, to obtain and file at once with the local registrar such certificate in complete form as the lapse of time will permit, together with a fee of $5, which shall be transmitted to the State Commissioner of Health and accounted for as a fee for certified copies. Local health officers and registrars should acquaint all physicians with this provision of the new law so that those who have failed to comply with the law in the past may file certificates of unreported births before the close of the present year.

Respectfully submitted,

F. D. BEAGLE,
Chief Clerk and Director of Vital Statistics

SPECIAL REPORT ON VITAL STATISTICS

Prof. Walter F. Willcox, Consulting Statistician

SPECIAL REPORT ON VITAL STATISTICS

ITHACA, N. Y., *July* 1, 1913.

EUGENE H. PORTER, M.D., Dr.P.H., *State Commissioner of Health, Albany, N. Y.*

SIR:— I have the honor to submit my sixth report as consulting statistician upon the vital statistics of New York State.

With two very important public health laws just going into effect and with more adequate appropriations than the Department has hitherto enjoyed, the question is at once raised: How can the great opportunity thus afforded be utilized to the best advantage of the people of the State?

The Department's work in vital statistics should be completely reorganized. In the hope of suggesting the lines along which such a reorganization should proceed, I have summarized the main results of my previous reports based upon such State and Federal mortality tables as were prepared annually when my work for the Department began, I have added some results of further analysis and especially of a few tabulations begun several years ago at my request and at the end of this report have brought together from various sources suggestions for the future statistical work of the Department. This report, then, is in three parts,— a summary of previous results, an interpretation of some special tables prepared at my request and suggestions for future work.

I. Summary of Previous Results in the Analysis of Mortality Statistics

Estimates of population. For New York State alone the best available method of estimating the population for each year between two censuses or after the last census is the method of assuming a constant rate of annual increase determined from the nearest two censuses, that is, the method of compound interest, the geometrical method or, as it is sometimes called, the Registrar-General's method. But for the United States or for the registration states as a group, between 1860 and 1900 and probably after 1910, the best available method is that of assuming a constant amount of annual increase, the method of simple interest, or the arithmetical method. As the results obtained by the two methods differ very little, as the arithmetical method is much simpler, and as it is used in the Federal reports and those of most registration states, I have used it in New York and advise that its use be continued.

Completeness and accuracy of the record. In many rural districts and perhaps in a few cities of New York State some deaths still escape registration, but their proportion is decreasing.

The death rate in New York State from ill-defined and unknown causes has fallen from 53.8 per 100,000 in 1900 to 13.6 in 1909 and 2.0 in 1912, indicating a great improvement in the care with which diagnoses are made.

Further evidence in support of this conclusion appears in the fact that the death rate in New York State from old age, an indefinite and unsatisfactory statement of the real cause of death, fell from 48.3 per 100,000 in 1900 to 19.9 in 1909 and 18.7 in 1912.

Seasonal distribution of deaths. The first four months in the year and the two hot months, July and August, have a high death rate with the maximum in February and March; the last four months in the year and May and June have a low death rate with the minimum in October and November.

Summer mortality has been decreasing of recent years and as a result the hot months are no longer the most dangerous to life.

Death rate in New York State. The death rate of New York State is very close to the 17 (16.94 for the decade 1900–1909) per 1,000 per annum which has long been regarded as the limit between the group of normal death rates and rates indicating by their size an undue proportion of preventable deaths.

The death rate of New York is below the probable death rate of the United States as a whole, which in 1900 was not far from 18 per 1,000[1] and at the present time is probably between 17 and 18.

The death rate in New York State is above that of the registration states as a group by about one per thousand per annum.

A part of this difference is due to a failure to record all deaths in some of the registration states, especially those which have recently introduced registration laws. In a large and normally constituted population a death rate below 10 is incredible, a death rate below 12 is very improbable and a death rate below 13 or perhaps even 14 may be viewed with some suspicion. Differences in the completeness of registration and in the proportion of children and of aged in the population of the registration states make comparison between their death rates unsafe.

The death rate in New York State decreased from 18.17 in 1900 to 16.13 in 1910, a fall of about eleven per cent in the ten years, indicating a saving of about 18,700 lives annually.

If the death rates are found by averaging the deaths for three years, 1899–1901 and 1909–11, the results indicate a saving of about 17,000 lives annually. Owing to an increasing completeness of registration in recent years the latter result is probably a minimum.

Death rates in New York City and the rest of the State. In the three five-year periods since Greater New York was organized in 1898 the death rate in the metropolis has differed from that in the rest of the State as follows: 1898–1902 +5.1 per 1,000; 1903–07 +2.2 per 1,000; 1908–12 —0.1 per 1,000,[2] showing that the difference between these two parts of the State has now disappeared.

The gradual disappearance of the difference between the death rate of New York City and that of the rest of the State is due in

[1] See the writer's paper, "Death Rate of the United States in 1900," in American Statistical Association *Quarterly Publications*, 10: 137 (1906).

[2] The average death rates in New York City and the rest of the State were as follows:

PERIOD	AVERAGE DEATH RATE		
	New York City	Rest of State	Excess in N. Y. City
1898–1902	19.8	14.7	5.1
1903–1907	18.3	16.1	2.2
1908–1912	15.6	15.7	—0.1

large part to more energetic and effective sanitary measures in the great city, which have lowered its death rate rapidly; but in part also to an improved registration of deaths in the rest of the State, which has made its reported death rate at the end of the period higher than at the beginning, while its true death rate is probably lower.

No comparison between city and country should fail to take account of the much larger proportion of elderly persons in nearly all country districts and their influence in raising the rural death rate. While the crude death rate of New York City is now about the same as that of the rest of the State, its corrected rate after allowing for differences in sex and age composition of the two population groups is higher.

Death rates in different parts of the State. The lowest death rates are found in the Adirondack counties and in the southwestern part of the State; the highest rates are found in the Hudson Valley and the southeastern counties.

Death rate by sex. The death rate of males is much higher than that of females. This difference is most marked during infancy and at ages of 40–54, so it cannot be due mainly to the greater danger of accident or of occupational disease among men.

Death rate by age. The death rate is highest in infancy and extreme old age; it falls rapidly from infancy to puberty and after that minimum is passed rises slowly with advancing years. At all ages up to 55 the death rate was lower in 1910 than in 1900; at all later ages it was higher.

II. FURTHER RESULTS

Since my last report was written the number of male and female deaths in New York State in 1910 has been given to the public by the Census Bureau and with that information the death rate of the two sexes can be found.

As appears from the following table the death rate of females is only about five-sixths that of males; the rate decreased for each sex between 1900 and 1910 but faster for females, so that the difference in their favor has increased.

DEATH RATES BY SEX: NEW YORK STATE[1]

SEX	DEATH RATE IN —		DECREASE	
	1900	1910	Amount	Per cent
Both	18.2	16.2	2.0	11.0
Male	19.3	17.4	1.9	9.8
Female	17.1	15.0	2.1	12.3

The analysis has been extended to include both sex and age, the death rates being given below and the extended table in the Appendix.[2]

DEATH RATES BY SEX AND AGE: NEW YORK STATE

AGE	MALE				FEMALE			
	DEATH RATE IN		INCREASE (+) OR DECREASE (—)		DEATH RATE IN		INCREASE (+) OR DECREASE (—)	
	1900	1910	Amount	Per cent	1900	1910	Amount	Per cent
All ages	19.3	17.4	— 1.9	— 9.8	17.1	15.0	— 2.1	—12.3
Under 1	183.0	156.6	—26.4	—14.4	152.2	130.2	—22.0	—14.4
1- 4	23.5	18.0	— 5.5	—23.4	21.5	16.7	— 4.8	—22.3
5- 9	5.1	3.9	— 1.2	—23.5	4.9	3.9	— 1.0	—20.4
10-14	2.9	2.4	— 0.5	—17.2	3.0	2.4	— 0.6	—20.0
15-19	4.7	4.0	— 0.7	—14.9	4.4	3.3	— 1.1	—25.0
20-24	7.4	5.7	— 1.7	—23.0	6.6	4.7	— 1.9	—28.8
25-29	9.0	6.8	— 2.2	—24.4	8.0	5.9	— 2.1	—26.3
30-34	10.6	8.6	— 2.0	—18.9	9.1	7.0	— 2.1	—23.1
35-39	12.4	11.4	— 1.0	— 8.1	10.0	7.9	— 2.1	—21.0
40-44	14.3	13.7	— 0.6	— 4.2	11.3	9.9	— 1.4	—12.4
45-49	17.0	17.3	+ 0.3	+ 1.8	14.2	12.3	— 1.9	—13.4
50-54	21.4	21.5	+ 0.1	+ 0.5	18.2	16.7	— 1.5	— 8.2
55-59	27.9	30.6	+ 2.7	+ 9.7	24.7	23.5	— 1.2	— 4.9
60-64	36.8	41.8	+ 5.0	+13.6	33.1	33.6	+ 0.5	+ 1.5
65-69	53.6	59.0	+ 5.4	+10.1	46.9	50.2	+ 3.3	+ 7.0
70-74	74.2	77.9	+ 3.7	+ 5.0	69.7	73.2	+ 3.5	+ 5.0
75-79	113.6	117.2	+ 3.6	+ 3.2	103.1	104.2	+ 1.1	+ 1.1
80-84	165.5	174.5	+ 9.0	+ 5.4	155.2	162.8	+ 7.6	+ 4.9
85-89	240.6	244.4	+ 3.8	+ 1.6	230.0	230.3	+ 0.3	+ 0.1
90 and over	359.0	381.8	+22.8	+ 6.4	332.0	339.3	+ 7.3	+ 2.2

The preceding table shows that a falling death rate is found among men below 45 and among women below 60 years of age.

[1] The figures from which these death rates are derived are:

SEX	1900			1910		
	Population	Deaths	Death rate	Population	Deaths	Death rate
Both	7,268,894	132,352	18.2	9,113,614	147,678	16.2
Male	3,614,780	69,687	19.3	4,584,597	79,664	17.4
Female	3,654,114	62,665	17.1	4,529,017	68,014	15.0

[2] Table 1, page 253.

As a rule the decennial improvement at any age period is greater among women; but at 1 to 9 years of age, the death rate of male children has fallen more rapidly than that of female children.

Through the courtesy of the Federal Census Bureau I have received from their unpublished full report on *Mortality Statistics 1910* figures showing the deaths classified by sex, age and general nativity (native white and foreign born white), and by combining these with the corresponding population figures from the census of 1910 a series of approximate death rates for 1910 have been computed. The figures given below show the death rate for each class and, for comparison, the corresponding rates in 1900.[1]

These figures show that the death rate of the colored is uniformly much higher than that of the native white or the foreign born white. One would expect to find that the foreign born white, many of whom are struggling to find a foothold in a new country, have a noticeably higher death rate than the native white of the

DEATH RATES BY SEX, AGE, RACE

MALE

	AGE	Native White				Foreign White				Colored			
		Death rate in —		Increase (+) or decrease (—)		Death rate in —		Increase (+) or decrease (—)		Death rate in —		Increase (+) or decrease (—)	
		1900	1910	Amount	Per cent	1900	1910	Amount	Per cent	1900	1910	Amount	Per cent
1	All ages	18.6	17.3	— 1.3	— 7.0	20.6	17.0	— 3.6	—17.5	27.9	26.5	— 1.4	— 5.0
2	Under 1	180.3	154.9	—25.4	—14.1	166.6	104.6	—62.0	—37.2	410.5	313.2	—97.3	—23.7
3	1- 4..	23.0	17.5	— 5.5	—23.9	31.6	21.7	— 9.9	—31.3	57.0	46.6	—10.4	—18.2
4	5- 9..	5.0	4.0	— 1.0	—20.0	5.3	3.4	— 1.9	—35.8	11.0	7.4	— 3.6	—33.7
5	10-14..	3.0	2.3	— 0.7	—23.3	2.5	2.5	.....	.....	8.1	7.1	— 1.0	—12.3
6	15-19..	4.6	3.9	— 0.7	—15.2	4.9	4.3	— 0.6	—12.2	10.2	11.3	+ 1.1	+10.8
7	20-24..	7.4	5.9	— 1.5	—21.3	6.8	5.2	— 1.6	—23.5	13.8	11.2	— 2.6	—18.8
8	25-29..	9.4	7.5	— 1.9	—20.2	7.9	5.6	— 2.3	—29.1	14.0	11.8	— 2.2	—15.7
9	30-34..	11.3	9.6	— 1.7	—15.0	9.3	6.9	— 2.4	—25.8	15.5	19.6	+ 4.1	+26.4
10	35-39..	12.4	12.3	— 0.1	— 0.8	12.2	9.8	— 2.4	—19.7	15.1	19.8	+ 4.7	+31.1
11	40-44..	13.6	13.7	+ 0.1	+ 0.7	15.0	13.2	— 1.8	—12.0	19.3	23.9	+ 4.6	+23.8
12	45-49..	14.7	16.6	+ 1.9	+12.9	19.8	17.7	— 2.1	—10.6	30.9	28.7	— 2.2	— 7.1
13	50-54..	17.2	19.6	+ 2.4	+14.0	26.0	23.6	— 2.4	— 9.2	32.0	32.4	+ 0.4	+ 1.2
14	55-59..	22.3	27.0	+ 4.7	+21.0	34.3	35.4	+ 1.1	+ 3.2	43.8	45.3	+ 1.5	+ 3.4
15	60-64..	31.0	37.4	+ 6.4	+20.6	43.4	46.9	+ 3.5	+ 8.1	40.5	57.4	+16.9	+41.7
16	65-69..	46.3	53.5	+ 7.2	+15.6	61.9	65.6	+ 3.7	+ 6.0	72.4	76.5	+ 4.1	+ 5.7
17	70-74..	67.5	72.3	+ 4.8	+ 7.1	82.2	85.2	+ 3.0	+ 3.7	90.2	77.5	—12.7	—14.1
18	75-79..	109.4	118.1	+ 8.7	+ 8.0	119.4	115.7	— 3.7	— 3.1	125.0	130.6	+ 5.6	+ 4.5
19	80-84..	156.1	163.9	+ 7.8	+ 5.0	182.4	190.7	+ 8.3	+ 4.6	163.1	163.5	+ 0.4	+ 0.2
20	85-89..	243.8	246.0	+ 2.2	+ 0.9	239.0	243.3	+ 4.3	+ 1.8	122.8	183.7	+60.9	+49.6
21	90 and over.	366.7	394.9	+28.2	+ 7.7	351.0	367.6	+16.6	+ 4.7	280.0	263.2	—16.8	— 6.0

[1] The extended tables will be found in the Appendix (Table 2), pages 254, 255.

same sex and age. In a general way this is true, but the preceding table reveals remarkable exceptions to that rule. At ages between 20 and 40 in 1900 and between 20 and 45 in 1910, the death rate of male immigrants is below that of native whites; at ages 10 to 30 in 1900 and 20 to 35 in 1910 the same is true of female immigrants. One conjectures that this may be an indication of the selective action of migration. The ages mentioned are those in which the great majority of immigrants arrive. Only the robust come, especially as they know that passing a careful medical examination is a prerequisite to entrance.

The inference is supported by the fact that the decennial decrease in the death rate among male immigrants was more than twice as rapid and among female immigrants nearly twice as rapid as among the native whites of the same sex. If my hypothesis that recent immigrants have a very low death rate is correct, the very rapid fall in the death rate of immigrants between 1900 and

AND NATIVITY: NEW YORK STATE

FEMALE

Native White				Foreign White				Colored				
Death rate in—		Increase (+) or decrease (—)		Death rate in—		Increase (+) or decrease (—)		Death rate in—		Increase (+) or decrease (—)		
1900	1910	Amount	Per cent	1900	1910	Amount	Per cent	1900	1910	Amount	Per cent	
16.1	14.4	— 1.7	—10.6	19.7	16.2	— 3.5	—17.8	24.7	21.7	— 3.0	—12.1	1
149.7	128.7	—21.0	—14.0	160.1	92.0	—68.1	—19.6	335.6	265.0	—70.6	—21.0	2
21.0	16.3	— 4.7	—22.4	30.5	18.6	—11.9	—39.0	49.6	40.1	— 9.5	—19.1	3
4.8	3.8	— 1.0	—20.8	5.0	3.9	— 1.1	—22.0	10.1	8.6	— 1.5	—14.9	4
2.9	2.3	— 0.6	—20.7	2.7	2.4	— 0.3	—11.1	12.3	7.2	— 5.1	—41.5	5
4.5	3.2	— 1.3	—28.9	3.6	3.2	— 0.4	—11.1	8.8	9.7	+ 0.9	+10.2	6
6.8	4.9	— 1.9	—27.9	5.8	4.0	— 1.8	—31.0	8.8	10.9	+ 2.1	+23.9	7
8.1	6.1	— 2.0	—24.7	7.6	5.3	— 2.3	—30.3	10.1	10.4	+ 0.3	+ 3.0	8
8.9	7.0	— 1.8	—20.5	9.3	6.6	— 2.7	—29.0	12.4	11.4	— 1.0	— 8.1	9
9.3	7.7	— 1.6	—17.2	11.0	7.9	— 3.1	—28.2	15.1	14.3	— 0.8	— 5.3	10
10.1	9.6	— 0.5	— 5.0	13.3	9.9	— 3.4	—25.6	19.7	20.2	+ 0.5	+ 2.5	11
12.4	11.3	— 1.1	— 8.8	16.9	13.5	— 3.4	—20.1	19.1	20.8	+ 1.7	+ 8.9	12
12.9	13.0	+ 0.1	+ 0.7	22.2	19.1	— 3.1	—14.0	25.4	29.8	+ 4.4	+17.3	13
19.4	19.8	+ 0.4	+ 2.1	31.3	28.8	— 2.5	— 8.0	39.3	36.4	— 2.9	— 7.4	14
25.4	27.5	+ 2.1	+ 8.3	41.7	41.0	— 0.7	— 1.7	52.2	49.8	— 2.4	— 4.6	15
38.2	42.7	+ 4.5	+11.8	57.0	59.4	+ 2.4	+ 4.2	62.0	69.6	+ 7.6	+12.3	16
58.7	64.5	+ 5.8	+ 9.9	83.1	85.2	+ 2.1	+ 2.5	86.3	49.7	—36.6	—42.4	17
83.4	86.0	+ 2.6	+ 2.8	117.5	115.0	— 2.5	— 2.1	110.7	96.0	—14.7	—13.3	18
148.7	152.7	+ 4.0	+ 2.3	167.5	179.2	+11.7	+ 7.0	136.8	131.7	— 5.1	— 3.7	19
224.2	223.9	— 0.3	— 0.2	246.9	242.1	— 4.8	— 1.9	117.6	175.8	+58.2	+49.5	20
326.4	339.0	+12.6	+ 3.9	355.0	348.5	— 6.5	— 1.8	183.3	222.2	+38.9	+21.2	21

1910 would be a natural result of the rapid influx of immigrants during that period. This is to be regarded as a provisional hypothesis to be confirmed or corrected by further evidence, as it can be discovered.

Death rate by marital condition. In 1909 the State Department of Health at my request began the tabulation of deaths from those parts of the State subject to its jurisdiction (viz., the parts outside of New York City and Buffalo) classified by sex, age and marital condition. The object of this tabulation was to facilitate a comparison between the death rates of single, married and widowed persons of a given sex and age, in the effort to throw light upon the relationship of marriage to health. Similar studies have been made in a number of European countries but none of importance in the United States. The only ones with which I am acquainted are those found in the Federal census reports of 1890 and 1900, and they are of little value because the age classification used, viz., 15–44, 45–64, 65 and over, embraces too few classes. For example, the average age of married persons 15–44 years of age would be much above that of single persons and much below that of widowed persons in the same age period. In consequence, when it appeared in 1900 that the death rate of married women 15–44 years of age was much above that of spinsters and much below that of widows, these differences were certainly due in part and perhaps entirely to the fact that the wives in that 30-year age period were older than the spinsters and younger than the widows. Age has so much influence upon the death rate that its effect must be eliminated or at least reduced much more than a classification into periods of 20 or more years reduces it, before the effect of marital condition can be determined. To secure this result it is necessary to have each marital class divided into age periods of not more than ten years each and five years would be even better.

The State Department of Health adopted a mean between the 20 and 30-year periods hitherto employed by the Census Bureau and the 5-year periods employed in the best foreign studies of the subject, and classified its deaths by 10-year periods, 20–29, etc., up

to 80. These periods, which are those employed in Germany, were adopted rather than the alternative 10-year periods, 25–34, etc., employed in England because a study of our American figures has shown that persons whose age is erroneously reported as 30, 40, 50, etc., are usually above and seldom below that age, i. e., the concentration on multiples of 10 is drawn mainly from one side. The deaths in 1909, 1910 and 1911 have been thus classified by sex, age and marital condition and the average annual number of deaths in each class determined.

To obtain rates the total population living in the State outside of New York City and Buffalo in 1910 must be similarly classified. The results already published by the census of 1910 lay a basis, but only a basis. They give the population of the State as a whole classified by sex and marital condition for the age periods 15–19, 20–24, 25–34, 35–44 and 45 and over; they give for Greater New York and Buffalo the classification by sex and marital condition for the age periods 15–24, 25–44 and 45 and over. I have assumed that within any age period and marital class reported in 1910 the proportions belonging to different ages were the same that they were in 1900. This gives an estimate of the figures for New York State, New York City and Buffalo and thus, by subtraction, for the rest of the State, classified by marital condition and the following age periods: 20–24, 25–29, 30–34, 35–44, 45–54, 55–64, 65 and over.

At this point a difficulty arises because of the fact, already mentioned, that the age classifications of the Federal census and the State Department of Health are different. To surmount this difficulty I have divided the age periods 35–44, 45–54, 55–64 and 65 and over, into five-year periods, by assuming that the proportions prevailing in Sweden, a country which for many purposes is taken as a standard in international statistics, prevailed also in New York State outside its two great cities. In this way I have estimated the population in New York State outside New York City and Buffalo in 1910 classified by sex, marital condition and five-year age periods from 20 to 80, and a residual class of 80 and over. After combining these results into the age periods 20–29, 30–39, and so on, it becomes possible to compare the deaths with the

other similar divergences, can best be explain
influence of selection. For example, the deatl
women is often higher than that of insured
age, a result in striking contrast to the lower
men in the general population, except perhaps
tween 20 and 30 years of age in some countri
ably due to the fact that a large proportion of
surance policies even when they believe then
health, while among the women who apply f
surance a notable proportion have reason to
health is subnormal. Certainly the results
figures furnish no ground for questioning my
ing the general population of New York State
City and Buffalo.

III. SUGGESTIONS FOR FUTURE DEVI

The vital statistics of New York State as h
by this Department have suffered from two se
they did not cover the entire State, because
not required to make returns to the Albany of
of those cities independently published did n
formation needed by the statistician; second
funds available for statistical tabulations at
with the utilization of such material as did
sult of these two defects New York's vital
developed with the same rapidity as the othe
health work and do not compare favorably
in other American states.

With the recent action of the State legis
proved public health and vital statistics laws
adequate appropriations, these defects, for r
Department of Health was responsible, are lik

The question now arises: How may this
partment's work be reorganized? Much de
selection of new tables to be prepared and
Department is not left entirely without g
registrars are realizing as never before the de
tunity for improvement, the need for a more

tabulation of vital statistics, state and municipal, if the figures are to serve as a measure of past progress and a guide in future work. In 1909 two committees on the subject of uniform tables of vital statistics were appointed, one by the American Statistical Association, another by the American Public Health Association, with the understanding that they would coöperate with the Census Bureau and with each other. The reports of these committees have been published and indicate clearly the direction in which improvements should be introduced. Being important and not easily accessible, they are appended to this report.[1] Since they were published, a committee of the Massachusetts Association of Boards of Health has been engaged independently on the same problem, but its report, I believe, has not yet appeared.[2] What is now most needed is that some state should take the lead in introducing tables based upon the suggestions thus worked out. New York is in an admirable position to render this service. I recommend, therefore, that tables be prepared by the Department for the year 1913 and future years according to the models printed at the end of this report.[3] So far as the information they call for can now be had for the year 1909, the latest year for which the full report of the Census Bureau on Mortality Statistics has appeared, the figures are inserted in the appropriate place in the model tables. In their present form they show the gaps in our information and the source, state or federal, in which what meager information exists can be found. Where the same tabulation has been made in two offices, a comparison between the results thus brought side by side furnishes some check upon their accuracy. The discrepancies may be partly explained by the fact that in 1909 the State Department of Health subtracted, while the Census Bureau did not subtract, the deaths in institutions among non-residents. Since that date the practice in this State has been changed to agree with that of the Census Bureau.

The items I have recommended for tabulation have been determined in part by the prevalent practice in American states and large cities as shown by the report of the American Statistical Association committee and in part by the decision of the Census Bureau regarding its tabulations of the living population.

[1] Appendix, pp. 253-256.
[2] Published in *American Journal of Public Health*, III: 595-631 (1913), as this report is going through the press.
[3] Appendix, pp. 253-256.

The main object of the tabulation of deaths i for computations of the death rates in vari population. These rates are ratios between t ing derived from a census and the population year given by a registration report. Hence, population in any class is thus given, there is li the deaths. For example, it is useless for to ascertain for a given county of New Yo deaths of males 20 to 29 years of age unless t census gives for that county the number of l years of age within which the deaths occur an death rate can be computed. But to this gen is one important exception. To measure infa not need to know the number of living infants number of births and the number of deaths un both terms of this ratio being obtained or obt Department of Health. Hence I have introd "under one" without reference to the censu

If the extended volumes of the census deal statistics were in print, the tables I have somewhat modified in detail. The principle unaffected. That principle is: Deaths sho far and only so far as the living population n tation of death rates has been classified; so as the totals of deaths and of population are furnish trustworthy rates; so far and only so found can be expected to throw helpful ligl condition of the locality.

With reference to the units of area for wh speak, probably the most familiar and, to th lation outside of large cities, the most in county. The city resident thinks of his city of New York thinks of his entire county a country districts. This is a natural result bonds between country districts and an adj stronger and more numerous than those bet parts of a county. Hence the natural uni like New York are the counties and within

above a certain limit of population, which should probably be 25,000. This limit is chosen because it is the one used by the Census Bureau in many urban tables and to classify deaths in any city where the living population has not been similarly classified would be a waste of labor. Then, too, in less populous cities many classes of population and of deaths would be too small to yield significant averages.

In arranging the counties the better order is the geographical one, which brings adjacent counties together. This method is used in international statistics, where countries are grouped geographically, and usually in Federal statistics, where states are grouped geographically. In city tables an alphabetical arrangement is common, but for the purposes of this Department a grouping of cities under the counties seems better, at least in certain tables. For convenience in finding any county in the tables alphabetical lists of the counties and cities of the state are introduced showing the number and letter of each county and city in the tables, and an outline map of the state showing the number of each county.

Respectfully submitted,

WALTER F. WILLCOX,

Consulting Statistician

APPENDIX

TABLE 1.— POPULATION, DEATHS AND DEATH RATES CLASSIFIED BY SEX AND AGE, NEW YORK STATE: 1900 AND 1910

AGE PERIOD	MALE						FEMALE					
	1900			1910			1900			1910		
	Population	De'ths	De'th rate	Population	De'ths	De'th rate	Population	De'ths	De'th rate	Population	De'ths	De'th rate
All ages......	3,614,780	69,687	19.3	4,584,597	79,664	17.4	3,654,114	62,665	17.1	4,529,017	68,014	15.0
Under 1......	80,473	14,721	183.0	97,245	15,228	156.6	79,048	12,034	152.2	94,308	12,275	130.2
1-4......	298,651	7,020	23.5	356,618	6,413	18.0	295,318	6,362	21.5	350,756	5,848	16.7
5-9......	357,834	1,809	5.1	403,516	1,590	3.9	355,888	1,743	4.9	400,352	1,551	3.9
10-14......	322,541	935	2.9	393,939	948	2.4	321,247	957	3.0	391,887	940	2.4
15-19......	307,220	1,447	4.7	408,962	1,653	4.0	333,462	1,463	4.4	433,487	1,427	3.3
20-24......	331,260	2,442	7.4	460,053	2,621	5.7	371,472	2,446	6.6	478,888	2,263	4.7
25-29......	342,170	3,080	9.0	450,570	3,051	6.8	352,899	2,826	8.0	429,273	2,539	5.9
30-34......	315,586	3,354	10.6	397,058	3,430	8.6	301,738	2,743	9.1	371,246	2,585	7.0
35-39......	288,203	3,564	12.4	365,522	4,151	11.4	272,490	2,722	10.0	346,687	2,747	7.9
40-44......	240,758	3,434	14.3	310,660	4,247	13.7	222,115	2,514	11.3	289,306	2,862	9.9
45-49......	186,599	3,175	17.0	258,842	4,474	17.3	181,022	2,571	14.2	244,836	3,011	12.3
50-54......	157,474	3,374	21.4	214,734	4,609	21.5	156,172	2,844	18.2	203,579	3,409	16.7
55-59......	118,115	3,301	27.9	148,218	4,536	30.6	121,670	3,010	24.7	145,942	3,433	23.5
60-64......	95,717	3,520	36.8	115,216	4,819	41.8	102,842	3,404	33.1	122,673	4,120	33.6
65-69[1]......	67,957	3,639	53.6	82,123	4,846	59.0	74,782	3,504	46.9	90,606	4,546	50.2
70-74......	48,554	3,602	74.2	58,618	4,566	77.9	52,459	3,657	69.7	63,621	4,655	73.2
75-79......	29,016	3,295	113.6	32,361	3,792	117.2	31,877	3,285	103.1	38,844	4,048	104.2
80-84......	13,762	2,278	165.5	15,249	2,660	174.5	15,877	2,464	155.2	19,187	3,123	162.8
85-89......	4,547	1,094	240.6	5,819	1,422	244.4	5,874	1,351	230.0	7,683	1,769	230.3
90 and over..	1,206	433	359.0	1,527	583	381.8	1,994	662	332.0	2,517	854	339.3
Age unknown.	7,137	170	.....	7,747	25	.....	3,868	103	.....	3,339	9	.....

[1] In the published figures for the population of 1910 ten-year age periods are given beyond age 64. These were subdivided into five-year periods by assuming that the same proportions prevailed as in 1900.

TABLE

POPULATION, DEATHS AND DEATH RATES CLASSIFIED BY SEX, AGE

MA

	AGE PERIOD	Native White[1]					
		1900			1910		
		Population	Deaths	Death rate	Population	Deaths	Death rate
1	All ages	2,604,331	48,431	18.6	3,078,904	53,406	17.3
2	Under 1	79,140	14,266	180.3	95,299	14,758	154.9
3	1- 4	289,880	6,664	23.0	342,705	6,010	17.5
4	5- 9	337,613	1,681	5.0	362,076	1,430	4.0
5	10-14	285,682	823	3.0	341,529	800	2.3
6	15-19	249,716	1,142	4.6	319,317	1,230	3.9
7	20-24	238,967	1,765	7.4	276,508	1,624	5.9
8	25-29	222,911	2,089	9.4	237,869	1,784	7.5
9	30-34	188,637	2,129	11.3	211,434	2,026	9.6
10	35-39	164,137	2,035	12.4	198,962	2,439	12.3
11	40-44	142,113	1,939	13.6	165,318	2,264	13.7
12	45-49	108,345	1,593	14.7	139,781	2,317	16.6
13	50-54	83,724	1,441	17.2	123,211	2,420	19.6
14	55-59	63,534	1,415	22.3	86,437	2,333	27.0
15	60-64	51,053	1,583	31.0	62,571	2,339	37.4
16	65-69[2]	36,964	1,713	46.3	45,487	2,433	53.5
17	70-74	26,714	1,804	67.5	32,804	2,371	72.3
18	75-79	17,132	1,875	109.4	17,901	2,115	118.1
19	80-84	8,752	1,366	156.1	9,140	1,498	163.9
20	85-89	2,925	713	243.8	3,464	852	246.0
21	90 and over	728	267	366.7	866	342	394.9
22	Age unknown	5,664	128	....	6,225	21	....

FE

	AGE PERIOD	Native White[1]					
		1900			1910		
		Population	Deaths	Death rate	Population	Deaths	Death rate
1	All ages	2,663,027	42,847	16.1	3,158,669	45,352	14.4
2	Under 1	77,649	11,627	149.7	92,495	11,900	128.7
3	1- 4	286,388	6,024	21.0	336,653	5,492	16.3
4	5- 9	335,317	1,621	4.8	358,813	1,368	3.8
5	10-14	284,165	822	2.9	339,340	792	2.3
6	15-19	260,369	1,169	4.5	329,938	1,062	3.2
7	20-24	258,331	1,766	6.8	298,995	1,473	4.9
8	25-29	233,269	1,898	8.1	251,062	1,531	6.1
9	30-34	192,366	1,707	8.9	223,195	1,566	7.0
10	35-39	168,502	1,559	9.3	206,355	1,590	7.7
11	40-44	142,130	1,429	10.1	170,045	1,628	9.6
12	45-49	109,364	1,356	12.4	144,352	1,626	11.3
13	50-54	86,459	1,291	14.9	124,505	1,867	15.0
14	55-59	67,669	1,310	19.4	87,123	1,725	19.8
15	60-64	54,970	1,398	25.4	67,812	1,862	27.5
16	65-69[2]	40,541	1,550	38.2	50,468	2,154	42.7
17	70-74	28,893	1,697	58.7	35,950	2,317	64.5
18	75-79	19,066	1,782	93.4	21,763	2,089	96.0
19	80-84	10,106	1,503	148.7	11,514	1,758	152.7
20	85-89	3,881	870	224.2	4,659	1,043	223.9
21	90 and over	1,244	406	326.4	1,478	501	339.0
22	Age unknown	2,348	62	....	2,154	8	....

[1] Includes whites of unknown nativity, as the population is thus classified by the Census Bureau.

[2] In the published figures for the population of 1910 ten-year age periods are given beyond age 64. These were subdivided into five-year periods by assuming that the same proportions prevailed as in 1900.

2

AND GENERAL NATIVITY, NEW YORK STATE: 1900 AND 1910

LE

Foreign Born White						Colored						
1900			1910			1900			1910			
Population	Deaths	Death rate	Population	Deaths	Death rate	Population	De'ths	Death rate	Population	De'ths	Death rate	
953,785	19,677	20.6	1,432,423	24,316	17.0	56,664	1,579	27.9	73,270	1,942	26.5	1
378	63	166.6	669	70	104.6	955	392	410.5	1,277	400	313.2	2
5,665	179	31.6	9,833	213	21.7	3,106	177	57.0	4,080	190	46.6	3
16,582	88	5.3	37,091	128	3.4	3,639	40	11.0	4,349	32	7.4	4
33,516	85	2.5	48,337	119	2.5	3,343	27	8.1	4,073	29	7.1	5
53,081	260	4.9	84,877	369	4.3	4,423	45	10.2	4,768	54	11.3	6
85,114	578	6.8	175,030	902	5.2	7,170	99	13.8	8,515	95	11.2	7
111,694	885	7.9	201,967	1,140	5.6	7,575	106	14.0	10,734	127	11.8	8
120,374	1,123	9.3	176,383	1,223	6.9	6,575	102	15.5	9,241	181	19.6	9
118,233	1,441	12.2	158,236	1,547	9.8	5,833	88	15.1	8,324	165	19.8	10
94,189	1,409	15.0	139,447	1,842	13.2	4,456	86	19.3	5,895	141	23.9	11
75,175	1,487	19.8	114,882	2,037	17.7	3,079	95	30.9	4,179	120	28.7	12
71,247	1,853	26.0	88,621	2,095	23.6	2,503	80	32.0	2,902	94	32.4	13
53,096	1,821	34.3	60,038	2,124	35.4	1,485	65	43.8	1,743	79	45.3	14
43,676	1,897	43.4	51,408	2,409	46.9	988	40	40.5	1,237	71	57.4	15
30,385	1,882	61.9	35,826	2,351	65.6	608	44	72.4	810	62	76.5	16
21,463	1,764	82.2	25,311	2,156	85.2	377	34	90.2	503	39	77.5	17
11,665	1,393	119.4	14,215	1,645	115.7	216	27	125.0	245	32	133.6	18
4,918	897	182.4	6,005	1,145	190.7	92	15	163.1	104	17	160.5	19
1,565	374	239.0	2,306	561	243.3	57	7	122.8	49	9	183.7	20
453	159	351.0	642	236	367.6	25	7	280.0	19	5	263.2	21
1,329	39	.....	1,299	4	......	150	3	......	223	.....	.....	22

MALE

Foreign Born White						Colored						
1900			1910			1900			1910			
Population	Deaths	Death rate	Population	Deaths	Death rate	Population	De'ths	Death rate	Population	De'ths	Death rate	
935,738	18,453	19.7	1,296,849	21,070	16.2	55,349	1,365	24.7	73,499	1,592	21.7	1
356	57	160.1	609	56	92.0	1,043	350	335.6	1,204	319	265.0	2
5,483	167	30.5	9,734	181	18.6	3,447	171	49.6	4,369	175	40.1	3
16,726	83	5.0	36,758	142	3.9	3,845	39	10.1	4,781	41	8.6	4
33,343	89	2.7	47,982	115	2.4	3,739	46	12.3	4,565	33	7.2	5
67,506	245	3.6	97,752	309	3.2	5,587	49	8.8	5,797	56	9.7	6
104,548	604	5.8	169,900	681	4.0	8,593	76	8.8	9,993	109	10.9	7
112,398	855	7.6	166,903	890	5.3	7,232	73	10.1	11,308	118	10.4	8
104,266	974	9.3	139,713	924	6.6	5,006	62	12.4	8,338	95	11.4	9
99,416	1,094	11.0	133,284	1,056	7.9	4,572	69	15.1	7,048	101	14.3	10
76,583	1,018	13.3	114,618	1,140	9.9	3,400	67	19.7	4,643	94	20.2	11
69,039	1,165	16.9	96,834	1,309	13.5	2,619	50	19.1	3,650	76	20.8	12
67,620	1,500	22.2	76,422	1,463	19.1	2,083	53	25.4	2,652	79	29.8	13
52,704	1,649	31.3	57,197	1,649	28.8	1,297	51	39.3	1,622	59	36.4	14
46,875	1,954	41.7	53,616	2,196	41.0	997	52	52.2	1,245	62	49.8	15
33,596	1,914	57.0	39,305	2,334	59.4	645	40	62.0	833	58	69.6	16
23,114	1,921	83.1	27,088	2,309	85.2	452	39	86.3	583	29	49.7	17
12,531	1,472	117.5	16,779	1,930	115.0	280	31	110.7	302	29	96.0	18
5,581	935	167.5	7,468	1,338	179.2	190	26	136.8	205	27	131.7	19
1,915	471	245.9	2,933	710	242.1	85	10	117.6	91	16	175.8	20
950	243	255.0	967	337	348.5	60	11	183.3	72	16	222.2	21
1,163	41	.....	987	1	......	177	....	......	198	.....	.....	22

TABLE 3

POPULATION, DEATHS AND DEATH RATES CL AGE AND MARITAL CONDITION, NEW YORK S OF NEW YORK CITY AND BUFFALO)

(Average of 1909, 1910, 1911)

MALE

AGE PERIOD	Single			Married		
	Population	Deaths	Death rate	Population	Deaths	Death rate
20–29.......	231,625	1,532	6.6	128,339	533	4.2
30–39.......	76,614	986	12.9	229,128	1,344	5.9
40–49.......	37,172	724	19.5	196,465	1,856	9.5
50–59.......	21,142	607	28.7	144,972	2,466	17.0
60–69.......	9,881	504	51.0	98,673	3,151	31.9
70–79.......	3,759	381	101.4	40,015	2,910	72.7
80 and over..	754	154	204.2	6,134	1,258	205.1

FEMALE

AGE PERIOD	Single			Married		
	Population	Deaths	Death rate	Population	Deaths	Death rate
20–29.......	145,537	684	4.7	176,583	1,006	5.7
30–39.......	54,769	405	7.4	227,473	1,428	6.3
40–49.......	35,812	357	10.0	187,947	1,536	8.2
50–59.......	19,389	386	19.9	124,673	1,803	14.4
60–69.......	12,062	448	37.1	68,781	1,933	28.1
70–79.......	5,623	462	82.2	21,112	1,296	61.4
80 and over..	1,058	296	279.8	1,848	360	194.8

REPORT OF COMMITTEE ON UNIFORM TABLES APPOINTED BY THE AMERICAN STATISTICAL ASSOCIATION[1]

The undersigned members of a committee appointed at the last annual meeting of this Association to cooperate with a committee of the American Public Health Association to consider forms of tables employed in registration reports, federal, state and municipal, and to draft a set of standard tables, have the honor to submit the following report of progress.

The form of statistical tables is dependent primarily upon the information which the tables are to convey. That information always consists in certain statistical totals combined in various ways. In American registration reports, as a class, the space given to tables regarding deaths greatly exceeds that given to all other tables. For this reason the present report is confined to mortality tables.

American registration of deaths is now based in nearly all cases upon a standard certificate. Hence the information open to tabulation is practically identical. Part of the information conveyed on a certificate is merely for identification or corroboration and has no statistical value. This is true regarding the decedent's name and that of the father and mother, the date of birth as distinguished from the age, the length of residence, the place and date of burial, and the name and address of the undertaker. After excluding these items, there remain for use in statistical tabulation the following:

(1) Place of death
(2) Time of death

as physical characteristics of the decedent:

(3) Sex
(4) Age
(5) Race or color
(6) Cause of death

as social or economic characteristics of the decedent:

(7) Birthplace
(8) Birthplace of father
(9) Birthplace of mother
(10) Marital condition
(11) Occupation

[1] See American Statistical Association *Quarterly Publications*, vol. XII. 510 514 (1911).

[illegible]

[illegible] characteristics [illegible] combinations [illegible] tions may be [illegible] occupation; quadrant [illegible] and [illegible] etc.

[illegible] extent of the tabulation [illegible] results [illegible] cities and the manner [illegible] problems concerning [illegible] may point out, however [illegible] many state and city reports [illegible] and accurate knowledge [illegible] the proper development [illegible] and the pub[illegible]

[illegible] had reason to believe that a series [illegible] introduced in future reports of st[illegible] or a substitute for those her[illegible] some quarters. Such tabl[illegible] American Statistical Asso[illegible]

[illegible] either to start w[illegible] attempt to [illegible] start afresh. [illegible] method a[illegible]

therefore inquired, What combinations of statistical data are now presented? To secure an answer to this question the latest available registration reports of every registration state and of ten registration cities, selected on the basis of size and location, have been examined. New York State and South Dakota were disregarded because of the almost complete absence of classification of deaths in the reports of those states. The District of Columbia was treated as a state rather than as a city. This gives a total of sixteen registration states. Of these sixteen the number which tabulate the several items without combination is as follows:

ITEM	Number of registration states in which it is tabulated
Place of death	16
Cause of death	14
Sex	7
Age	7
Time of death (month)	6
Birthplace (native or foreign born)	4
Race or color	2
Nativity of parents	1
Marital condition	1
Occupation	1

The number of possible combinations of two items in a series of eleven is determined by a simple mathematical formula to be fifty-five. Of these the following are found most commonly in the sixteen registration states:

COMBINATION	Number of registration states in which it is tabulated
Cause and place	13
Sex and cause	10
Sex and place	10
Age and cause	10
Time and cause	9
Sex and age	8
Place and nativity	7
Age and place	7
Place and color	5

Of the fifty-five possible combinations of
are found in at least five of the sixteen states
from one to four states and thirty-five are nc
As examples of dual classifications of deaths
registration state, the following may be nan
by sex and occupation, by sex and marital c
nativity, by occupation and race.

An examination of the tables published in
selected cities does not show any significant c
state and city forms.

Your committee recommends then that al
now giving this information be urged so to ı
to include in them the eight dual classificati
by at least seven of the registration states, na

Sex and age
Place and sex
Place and age
Place and nativity
Place and cause
Cause and sex
Cause and age
Cause and time

and that all states and cities having more
Negroes, Chinese or Japanese in their popul
ulate also by place and color.

In a series of eleven items the number of
three items which is mathematically possibl
sixty-five, or three times the possible numbei
The possible combinations of four items i
thirty. But the labor and cost of tabulatin
greater than those required for two. It is
fore, to find that, while of the fifty-five pos
two items, twenty, or thirty-six per cent, are
state, of the one hundred and sixty-five pos
three items only twenty-five, or fifteen per cen

one state, and of the three hundred and thirty possible combinations of four items, only ten, or three per cent, are found in even one state and only one is found in two states. Having in mind this omission of complicated tabulations by American states and cities at the present time and also the difficulty and cost of introducing them, your committee does not recommend any material extension of the work of municipal and state registration offices into these now unoccupied fields. It suggests, indeed, that these fields are just the ones in which the Federal government, acting through the Bureau of the Census, may best aid city and state health work by preparing such complicated and expensive tables for the registration area and its leading divisions. But while it is convinced of the wisdom of this general principle your committee does urge the inclusion of one table giving the triple combination by sex, age and cause of death as far more valuable and no more difficult to prepare than the three dual combinations by sex and age, sex and cause, and age and cause now found in at least one-third of the registration states.

To make its recommendations more specific and thus, perhaps, more helpful it submits the following drafts of tables:[1]

The preceding five tables include all the combinations of two items now presented in any five of the registration states and thus may be regarded as a sort of codification of prevailing practice in American states and cities. They are to be regarded merely as a minimum that should be included in every state and city registration report, and not as precluding the retention or formation of other tables. In fact, a series of desirable supplemental tables will be considered by this committee for presentation later to the Association and the co-operating agencies (American Public Health Association and Bureau of the Census), but the matter of greatest present importance is to *make a beginning,* with a few simple yet fundamental tables, the general adoption and practical use of which in state and city reports will pave the way for further progress. If too elaborate a set of tables be recommended at the outset, it is likely that they will not generally be adopted.

[1] These tables were to have been published by the Census Bureau, but, for reasons over which be committee had no control, their publication was postponed and has not yet (August, 1913) been made.

As an aid to the execution of this plan, it is suggested that, if the co-operating Committee of the American Public Health Association approve, these standard tables be recommended for adoption as "Rules of Statistical Practice" by the organized registration officials of the country. This will, of course, require action at the next meeting of that Association, which will be held at Havana next year, and in the meantime the forms of tables can be scrutinized thoroughly and perhaps some additional tables be recommended.

WALTER F. WILLCOX
THOMAS S. ADAMS
FREDERICK S. CRUM
C.-E. A. WINSLOW
ALLYN A. YOUNG

REPORT OF COMMITTEE ON UNIFORM TABLES APPOINTED BY THE AMERICAN PUBLIC HEALTH ASSOCIATION[1]

The committee appointed to cooperate with a corresponding committee of the American Statistical Association and with the Bureau of the Census begs leave to submit the accompanying memorandum on uniform tables as its report of progress, with the request that such of the specific recommendations as may seem advisable be adopted as rules of statistical practice.

The cooperating committee of the American Statistical Association, through its chairman, Professor Walter F. Willcox, presents a draft of a report[2] of that Association, with forms of tables, which is incorporated in this report, subject to any amendments or alterations that may be made, prior to its adoption, by the American Statistical Association.

There is also appended to this report a circular letter issued by the Bureau of the Census, and it is urged that the report be published, if feasible, perhaps as a census pamphlet, as a basis upon which definitive recommendations and forms of tables may be presented for adoption at the next session of the Association.

The problems involved are so far-reaching and difficult in their practical solution that it would seem necessary to proceed slowly

[1] See *Journal of the American Public Health Association*, I: 592–598 (1911).
[2] In the main, the report printed above, pp. 257–262

and cautiously rather than to exhibit undue haste in the formulation of proposed forms.

Respectfully submitted,

WM. C. WOODWARD
MARSHALL LANGTON PRICE
CHAS. A. HODGETTS
F. L. WATKINS

Committee

MEMORANDA ON UNIFORM TABLES FOR VITAL STATISTICS

1. It is more expedient to discuss the general question of securing uniformity and to agree upon some general principles than it is to adopt at this time any actual forms of standard tables.

2. Standard tables should be considered with reference to their appropriateness for, first, the census reports; second, state reports and bulletins; third, city reports and bulletins.

3. Census reports should deal primarily with states and large cities, giving only the fundamental data for small cities and counties. They should deal with data in the mass, for broad comparisons chiefly, and to establish standards (e. g., corrected rates, general life tables) with which local comparisons can be made.

4. State reports should begin where the census reports leave off, and study the state as a unit; and they should give special attention to counties and groups of counties (e. g., see Bulletins of Indiana, Michigan, and New York), and should present data in considerable detail for small cities and villages, singly and grouped into cities of from 5,000 to 10,000 population, etc. They may even take up the individual towns or townships when such units are important, but they should not go into the subdivisions of large cities that maintain an efficient registration service.

5. City reports, especially those of large cities, should deal with the primary units of area (city blocks) grouped into such larger aggregates (wards or sanitary districts) as may be found advisable, and they should specialize on morbidity statistics and their relation to mortality statistics.

6. Whatever mortality statistics are worth printing at all are, as a rule, worth printing with full details of sex, age, and color

As an aid to the execution of this plan, the co-operating Committee of the Americ ciation approve, these standard tables be tion as " Rules of Statistical Practice " by tion officials of the country. This will, o at the next meeting of that Association, Havana next year, and in the meantime t be scrutinized thoroughly and perhaps so recommended.

WA
THO
FRE
C.-F
ALL

REPORT OF COMMITTEE ON UNIFORM TABL AMERICAN PUBLIC HEALTH AS

The committee appointed to cooperate committee of the American Statistical As Bureau of the Census begs leave to sub memorandum on uniform tables as its repo request that such of the specific recomme advisable be adopted as rules of statistical

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The problems involved are so far-reachin practical solution that it would seem neces

[1] See *Journal of the American Public Health Association*, I: 592
[2] In the main, the report printed above, pp. 257–262

Pneumonia
Diarrhea and enteritis
By months, weeks and days of age
Congenital debility, etc.
By months, weeks and days of age

11. Causes of death with death rates should be presented for each year since the beginning of registration, if practicable according to the abridged International Classification, otherwise according to the list of the International Table of the Registrar-General's Report.

12. The first general tables constructed should provide for the data contained in the main tables of the international statistics of the *Statistique Generale* of France.

13. Every report should contain a table showing the dates and population, by sex and ages, at several recent censuses.

14. Every report should contain a table showing the elements of population, by sex, age, color, nativity, etc., at the last census.

TABLES SUGGESTED FOR INCLUSION IN FUTURE REPORTS OF THE DIRECTOR OF VITAL STATISTICS OF NEW YORK STATE

[These draft tables are based mainly on the report of the committee of the American Statistical Association modified slightly in view of the special conditions in New York State and the population tables in the *Abstract* of the Thirteenth Census. Other changes may become advisable when the full report of the Thirteenth Census on population is published. Columns headed "Federal" and "State" are introduced merely to show what information is now obtainable from either source. Blanks in both columns mark gaps in our present knowledge which would be filled by the proposed tables. Of course the new tables should aim to supplement rather than to reproduce information now given by the Federal Census Bureau. Counties are arranged and numbered as shown in the outline map on page 270. See also comments pp. 247–249.]

TABLE 1A

DEATHS CLASSIFIED BY SEX, BY AGE AND BY MONTH, NEW YORK STATE AND COUNTIES: 1909

Map No.	COUNTY	Total		Male		Female		Under 1		1-5 *		January		February	
		Federal	State	Federal	State	Federal	State	Federal	State	Federal	State	Federal	State	Federal	State
	State........	140,073	140,261	75,466	75,599	64,607	64,662	26,175	26,077	....	....	11,882	11,486	11,181	11,011
1	St. Lawrence	......	1,317	......	......	......	......	......	......	....	....	......	......	......	......
2	Franklin.....	732	825	......	......	......	......	149	......	....	....	51	......	54	......
3	Clinton......	......	644	......	......	......	......	......	......	....	....	......	......	......	......
4	Jefferson.....	......	1,181	......	......	......	......	......	......	....	....	......	......	......	......
5	Lewis.......	367	371	......	......	......	......	41	......	....	....	29	......	31	......

* Other age periods should be: 6-9, 10-14, 15–20, and 21 and over, in order to compare deaths with living population.

The age classifications of deaths used at present are: Federal — *Mortality Statistics* — Under 1, 1, 2, 3, 4, under 5, 5-year periods to end of life. State Department of Health — Under 1, 1–4, 5–19, 20–39, 40–59, 60 and over.

Table 1A. The county table in the state supplement to the *Abstract* of the Thirteenth Census gives for each county in the state the total population and the number aged 6–9, 10 and over, 10–14, 15–17 and 18–20. From these all age classes given in Table 1A, except the first, can be derived; viz., under 1, 1–5, 6–9, 10–14, 15–20, and 21 and over. As there is little reason for discriminating the two age periods 15–17 and 18–20 in mortality tables, they have been combined in my draft.

Pneumonia
Diarrhea and enteritis
By months, weeks and days of age
Congenital debility, etc.
By months, weeks and days of age

11. Causes of death with death rates should be presented for each year since the beginning of registration, if practicable according to the abridged International Classification, otherwise according to the list of the International Table of the Registrar-General's Report.

12. The first general tables constructed should provide for the data contained in the main tables of the international statistics of the *Statistique Generale* of France.

13. Every report should contain a table showing the dates and population, by sex and ages, at several recent censuses.

14. Every report should contain a table showing the elements of population, by sex, age, color, nativity, etc., at the last census.

TABLES SUGGESTED FOR INCLUSION IN FUTU DIRECTOR OF VITAL STATISTICS OF NE

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TABLE 1A

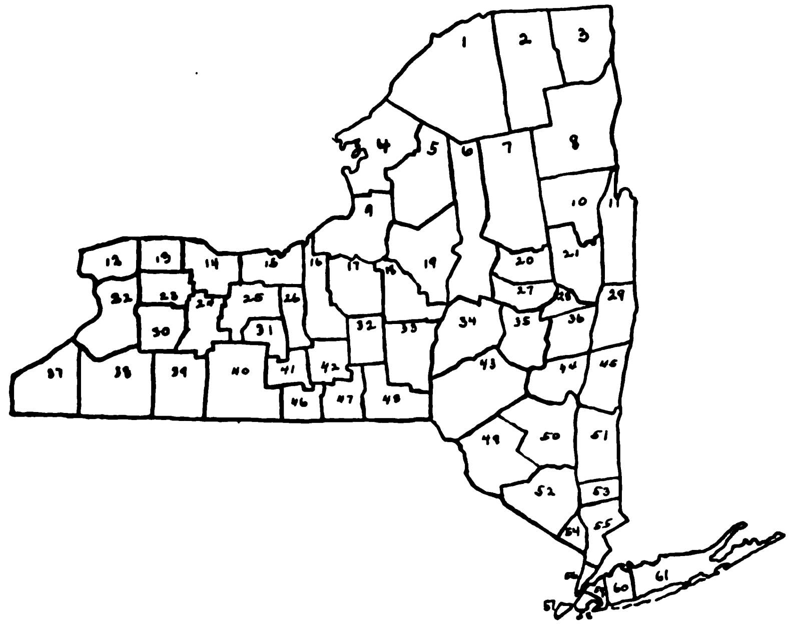
DEATHS CLASSIFIED BY SEX, BY AGE AND BY STATE AND COUNTIES: 19

Map No.	COUNTY	Total Federal	Total State	Male Federal	Male State	Female Federal	Female State	Under 1 Federal	Under 1 State
	State........	140,073	140,261	75,466	75,599	64,607	64,662	26,175	26,077
1	St. Lawrence.......	......	1,317	......	......	......	......	......	......
2	Franklin.....	732	825	......	......	......	......	149	......
3	Clinton......	......	644	......	......	......	......	......	......
4	Jefferson.....	......	1,181	......	......	......	......	......	......
5	Lewis.......	367	371	......	......	......	......	41	......

* Other age periods should be: 6-9, 10-14, 15-20, and 21 and over, i living population.
The age classifications of deaths used at present are: Federal — *Morta* under 5, 5-year periods to end of life. State Department of Health — 60 and over.

Table 1A. The county table in the state su *stract* of the Thirteenth Census gives for eacl the total population and the number aged 6–9, 15–17 and 18–20. From these all age classes except the first, can be derived; viz., under 15–20, and 21 and over. As there is little rea ing the two age periods 15–17 and 18–20 in n have been combined in my draft.

INDEXED MAP OF NEW YORK COUNTIES

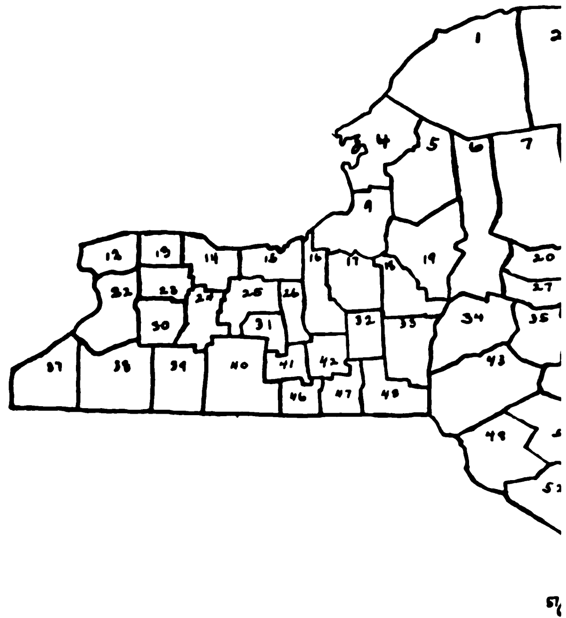


ALPHABETICAL LIST OF COUNTIES

	Map No.		Map No.
Albany	36	Oneida	19
Allegany	39	Onondaga	17
Broome	48	Ontario	25
Cattaraugus	38	Orange	52
Cayuga	16	Orleans	13
Chautauqua	37	Oswego	9
Chemung	46	Otsego	34
Chenango	33	Putnam	53
Clinton	3	Queens	59
Columbia	45	Rensselaer	29
Cortland	32	Richmond	57
Delaware	43	Rockland	54
Dutchess	51	St. Lawrence	1
Erie	22	Saratoga	21
Essex	8	Schenectady	28
Franklin	2	Schoharie	35
Fulton	20	Schuyler	41
Genesee	23	Seneca	26
Greene	44	Steuben	40
Hamilton	7	Suffolk	61
Herkimer	6	Sullivan	49
Jefferson	4	Tioga	47
Kings	58	Tompkins	42
Lewis	5	Ulster	50
Livingston	24	Warren	10
Madison	18	Washington	11
Monroe	14	Wayne	15
Montgomery	27	Westchester	55
Nassau	60	Wyoming	30
New York	56	Yates	31
Niagara	12		

DIVISION OF COMMUNICABLE DISEASES

INDEXED MAP OF NEW YORK

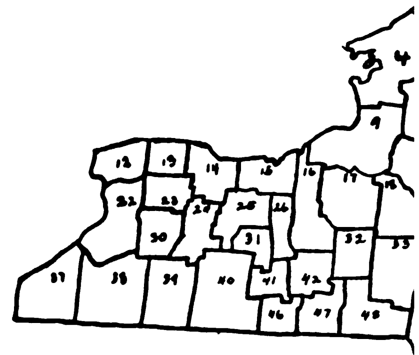


ALPHABETICAL LIST OF COUNT

	Map No.	
Albany	36	Oneida
Allegany	39	Onondaga
Broome	48	Ontario
Cattaraugus	38	Orange
Cayuga	16	Orleans
Chautauqua	37	Oswego
Chemung	46	Otsego
Chenango	33	Putnam
Clinton	3	Queens
Columbia	45	Rensselaer
Cortland	32	Richmond
Delaware	43	Rockland
Dutchess	51	St. Lawrence
Erie	22	Saratoga
Essex	8	Schenectady
Franklin	2	Schoharie
Fulton	20	Schuyler
Genesee	23	Seneca
Greene	44	Steuben
Hamilton	7	Suffolk
Herkimer	6	Sullivan
Jefferson	4	Tioga
Kings	58	Tompkins
Lewis	5	Ulster
Livingston	24	Warren
Madison	18	Washington
Monroe	14	Wayne
Montgomery	27	Westchester
Nassau	60	Wyoming
New York	56	Yates
Niagara	12	

DIVISION OF COMMUNICABLE DISEASES

Indexed Map of



Alphabetical List of

	Map No.	
Albany	36	Oneid
Allegany	39	Onon
Broome	48	Ontar
Cattaraugus	38	Oran
Cayuga	16	Orle
Chautauqua	37	Oswe
Chemung	46	Otse
Chenango	33	Putn
Clinton	3	Que
Columbia	45	Ren
Cortland	32	Rich
Delaware	43	Roc
Dutchess	51	St.
Erie	22	Sar
Essex	8	Sch
Franklin	2	Sch
Fulton	30	Sch
Genesee	23	Ste
Greene	44	Ste
Hamilton	7	Su
Herkimer	6	[illegible]
Jefferson	4	[illegible]
Kings	58	[illegible]
Lewis	5	[illegible]
Livingston	24	[illegible]
Madison	18	[illegible]
Monroe	14	[illegible]
Montgomery	27	[illegible]
Nassau	[illegible]	[illegible]
New York	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

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DIVISION OF COMMUNICABLE DISEASES

ALBANY, N. Y., *June* 1, 1913.

EUGENE H. PORTER, M.D., Dr.P.H., *State Commissioner of Health, Albany, N. Y.:*

SIR:— I herewith transmit the Annual Report of the Division of Communicable Diseases for the year 1912.

This division has continued its efforts along the lines of preventive medicine, materially contributing to the successful suppression of outbreaks of communicable diseases in their incipiency, thereby preventing introduction into other localities and possible spread throughout the State.

Persistent vigilance has been maintained over all outbreaks of the communicable diseases throughout the State, each individual report card being carefully examined and considered not only in relation to the family affected, but also regarding the possibility of the infection being conveyed to others in the community or neighboring municipalities. Strict attention to the individual report cards enables us to determine whether all precautions are being taken by the local health authorities to prevent the spread of the disease and the possibility of the need of assistance from the State Department of Health in the control of the outbreak. This assistance has been freely rendered in many instances and has been greatly appreciated by the health officers throughout the State, who frequently find the people antagonistic and ready to dispute the necessity of the quarantine and other preventive measures ordered by the local health authorities, while a ready acquiescence and co-operation is given the recommendations of the State Department of Health medical officers, who have visited practically every municipality in the State.

The distribution of the instructive circulars on communicable diseases has been continued and the frequent requests received

year and the hearty co-operation of the State Charities Aid Association in this effort to teach the public the value of preventive measures in the control of tuberculosis has proven of material benefit.

Our chief endeavor has been to secure the support of the public in the procuring of adequate facilities for the care of tuberculosis patients through the establishment of county hospitals and as an evidence of the effectiveness of the campaign waged it may be mentioned that nine applications for approval of sites for tuberculosis hospitals were filed with the Department during the past year. Six of these applications were granted, two denied and one withdrawn.

The Schenectady County Hospital for Tuberculosis was formally opened.

The city of Buffalo has established a hospital for incipient tuberculosis at Perrysburg and is contemplating the building of a sanitarium for advanced cases.

Typhoid Fever

This preventable disease has been decreased in prevalence throughout the State, although several outbreaks have occurred which occasioned considerable uneasiness and called not alone for the services of medical officers from this division, but also members of the engineer's staff were frequently called upon for aid in determining the source of the infection, which is often found to be due to an impure water supply.

Among the more notable outbreaks may be mentioned that at Corning, Steuben county, and at Middletown, Orange county. The epidemic at Corning assumed alarming proportions, although the cases were as a rule of the mild type and the mortality was not great. A full report of this outbreak will be found in the report of the engineering division.

Frequent evidence of contact infection is found, and the necessity of maintaining a modified quarantine has been fully demonstrated. The greatest prevalence of the disease occurred during the month of August, when 997 cases were reported, and the

TABLE SHOWING THE MONTHLY PREVALENCE OF DISEASE

1908

	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Tuberculosis	1,865	1,802	2,775	2,216	1,982	2,021	2,297	1,962	2,657	2,328	2,097	2,228	26,230
Diphtheria	2,134	2,015	2,308	1,823	1,833	1,522	1,151	787	1,415	1,805	1,960	2,006	20,759
Scarlet fever	3,187	3,918	5,831	3,412	4,547	2,248	913	573	972	1,254	1,658	1,890	30,403
Measles	5,796	7,984	12,019	11,201	9,777	5,241	1,900	515	449	606	1,147	2,103	58,738
Typhoid fever	434	418	357	285	312	412	517	956	1,197	923	586	579	6,976
Cerebro meningitis	62	60	76	61	58	32	41	35	42	52	28	35	582
Smallpox	265	71	108	49	48	59	8	4	5	92	55	20	784
Ophthalmia	6	1	4	1	2	3	1	3	1	0	5	1	28
	13,749	16,269	23,478	19,048	18,559	11,538	6,828	4,835	6,738	7,060	7,536	8,862	144,500

1909

	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Tuberculosis	3,739	2,352	3,007	3,015	2,671	2,783	2,638	2,529	2,664	2,276	2,943	2,208	32,915
Diphtheria	2,406	2,032	2,118	1,584	1,591	1,899	1,126	916	1,291	1,421	2,299	1,882	20,665
Scarlet fever	2,696	2,517	3,175	2,475	2,253	1,890	724	608	754	1,150	1,962	2,543	22,747
Measles	4,366	4,761	6,876	7,053	7,033	8,153	2,695	1,031	688	1,160	3,257	5,790	52,863
Typhoid fever	515	341	389	258	361	336	474	851	1,880	1,120	867	505	7,897
Cerebro meningitis	27	44	56	45	45	42	34	33	45	46	30	19	466
Smallpox	63	72	32	33	42	25	16	12	2	7	29	53	386
Ophthalmia	7	3	5	1	1	4	7	2	2	7	0	5	44
	13,819	12,122	15,748	14,464	13,997	15,132	7,714	5,982	3,726	7,187	11,387	13,105	137,983

1910

	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Tuberculosis	2,416	3,203	4,497	3,969	3,418	2,692	2,621	3,375	2,856	2,684	3,240	2,902	37,963
Diphtheria	2,018	2,025	2,489	2,447	2,654	1,835	1,468	1,363	1,010	1,509	2,144	1,668	22,630
Scarlet fever	3,655	4,565	5,346	4,412	4,061	2,486	987	688	579	924	1,673	2,128	31,504
Measles	9,726	10,047	13,770	9,931	10,490	6,837	2,474	883	452	722	1,593	2,953	69,878
Typhoid	456	566	457	322	374	356	486	1,203	1,457	1,293	989	577	8,536
Cerebro meningitis	27	32	34	32	36	20	21	36	28	22	17	26	331
Smallpox	51	50	69	61	55	41	10	10	1	1	2	2	353
Ophthalmia	......	......	2	2	4	4	6	1	7	5	5	2	38
Poliomyelitis	......	......	......	......	......	......	......	......	57	35	18	2	112
	18,349	20,488	26,664	21,176	21,092	14,671	8,073	7,559	6,447	7,195	9,681	10,350	171,345

1911

	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Tuberculosis	3,038	3,662	3,219	2,774	3,519	2,374	2,599	3,030	2,395	2,198	2,734	2,441	33,983
Cancer	74	66	75	48	32	47	55	47	42	44	25	48	603
Diphtheria	1,937	2,189	1,783	1,617	2,167	1,628	1,200	1,349	1,152	1,456	2,004	1,926	20,417
Scarlet fever	3,084	3,839	4,127	3,749	4,043	1,813	774	493	453	882	1,273	1,565	26,095
Measles	4,068	4,979	6,657	8,030	10,359	5,377	2,744	1,020	465	742	1,477	2,757	48,675
Typhoid fever	420	521	449	346	364	412	641	1,407	1,168	893	792	670	8,083
Cerebro meningitis	36	44	61	48	46	41	27	30	41	21	31	21	447
Poliomyelitis	6	5	6	5	1	9	16	34	28	16	11	2	139
Smallpox	7	5	6	5	34	33	25	14	9	9	24	166	337
Ophthalmia	7	9	7	7	13	4	1	4	6	6	5	4	73
Pneumonia	479	732	624	628	263	93	58	60	82	141	191	316	3,676
Whooping cough	734	763	937	738	989	753	637	600	395	394	751	665	8,362
	13,890	16,814	17,951	17,995	21,830	12,584	8,786	8,103	6,236	6,802	9,318	10,581	150,890

1912

	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Tuberculosis	2,527	2,620	2,687	2,596	3,005	2,615	2,624	2,317	2,457	2,650	2,136	2,285	30,520
Cancer	55	55	60	71	34	55	56	41	38	41	45	44	598
Diphtheria	1,897	1,754	1,890	1,653	1,592	1,577	282	1,051	976	1,639	1,892	1,938	18,141
Scarlet fever	1,916	2,351	3,141	2,781	2,321	1,506	755	423	453	669	906	1,483	18,705
Measles	4,831	6,420	10,721	11,342	11,284	7,522	3,684	1,156	575	1,203	2,485	4,070	65,299
Typhoid fever	483	316	336	434	414	289	521	1,007	982	836	413	387	6,418
Cerebro meningitis	22	33	35	47	33	30	45	28	27	27	27	27	381
Poliomyelitis	36	38	41	25	21	45	119	223	253	176	80	31	1,108
Smallpox	178	88	54	33	41	24	35	22	44	48	112	135	894
Ophthalmia	5	5	6	3	5	10	8	14	4	2	3	11	76
Pneumonia	500	548	546	421	310	213	91	86	94	208	221	478	3,716
Whooping cough	978	771	709	778	925	753	700	472	368	405	458	506	7,821
	13,426	15,035	20,226	20,184	19,985	14,639	8,923	6,840	6,271	7,904	8,858	11,395	153,986

The sligh
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TABLE S

Albany
Allegany
Broome
Cattaraugus
Cayuga
Chautauqua
Chemung
Chenango
Clinton
Columbia
Cortland
Delaware
Dutchess
Erie
Essex
Franklin
Fulton
Genesee
Greene
Hamilton
Herkimer
Jefferson
Lewis
Livingston
Madison
Monroe
Montgomery
Nassau
Niagara
Oneida
Onondaga
Ontario
Orange
Orleans
Oswego
Otsego
Putnam
Rensselaer
Rockland
St. Lawrence
Saratoga
Schenectady
Schoharie
Schuyler
Seneca
Steuben
Suffolk
Sullivan
Tioga
Tompkins
Ulster
Warren
Washington
Wayne
Westchester
Wyoming
Yates
Greater N. Y.

cases were reported. The persistence of the bacilli in the cultures from the throats of convalescent patients long after the disappearance of all clinical symptoms has been a frequent source of controversy between the quarantined families and the health officers, but in the majority of cases the quarantine has been maintained until negative cultures were obtained.

An outbreak of diphtheria at St. Johnsville necessitated the services of a bacteriologist from the State Department of Health for several days in order to isolate the affected scholars in the schools and employes of a factory before the disease was brought under control. The same difficulty was encountered at Tuckahoe where the disease gained a foothold among the foreign population, who bitterly resented what they considered the unwarranted interference with their personal liberty by the health officer who was unable to enforce the necessary measures of precaution against the spread of the infection until a representative of the State Department of Health was detailed to take cultures from all suspected cases and otherwise aid the local health authorities.

An error of diagnosis led to a serious outbreak in the western portion of the State, the disease having been diagnosed as laryngitis. This resulted in two deaths, and public funerals followed by an outbreak in which nearly forty cases were traceable to the supposed laryngitis. Energetic work by a medical officer from this Department assisted by the health officer of the town finally stamped out the epidemic.

Scarlet Fever

This acute disease has been greatly reduced in prevalence and the cases have been extremely mild in character, frequently requiring the services of a medical officer from the State Department of Health in order to determine the diagnosis and enforce the quarantine measures necessary to prevent the spread of the infection.

An outbreak at Craig Colony for Epileptics which occurred in February occasioned some alarm, as 180 patients were housed in the same house, but the prompt diagnosis and removal of the scarlet fever patient to the isolation hospital together with a strict quarantine prevented the further spread of the contagion.

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Frequent evidence of contact infec sity of maintaining a modified qua onstrated. The greatest prevalence ing the month of August, when 997

month of least prevalence was June, when but 278 cases were reported. There were 8,536 cases reported in the year 1910, and 8,083 cases reported in the year 1911, while this year but 6,713 cases were reported, although every rumor of the disease has been followed up in an endeavor to secure full reports.

The reduction in the prevalence of typhoid fever in the city of Niagara Falls since the filtration plant went into operation in May, 1912, is another proof that typhoid fever can be controlled if the municipalities will take the necessary precautions. There were only 66 cases reported from Niagara Falls during 1912, of which cases 54 occurred during the first five months of the year before the filtration plant was in operation.

Several cases of typhoid fever were traced to a summer resort on the Hudson river where the people and visitors were allowed to drink the raw Hudson river water. The health officer was immediately notified by the State Department of Health of the danger existing at this picnic ground and steps were at once instituted to provide a safe drinking water for the patrons. No cases have occurred since the introduction of a pure drinking water at this resort.

The city of Newburgh was visited by an explosive outbreak of typhoid fever, which was found to be confined to families supplied with milk by one dealer who obtained his supply from a neighboring farmer, who gave the history of having had typhoid fever several years previously. An unsuccessful attempt was made to secure samples of the stool from the suspected carrier, who absolutely refused to permit the examination. However, the sale of this milk was interdicted in the city of Newburgh, which was followed by a termination of the epidemic. This may have been simply a coincidence and should not be taken as positive proof that the man was a carrier of typhoid germs.

The frequent recurrence of typhoid fever at Greenville Center led to an investigation with the view of locating a possible typhoid carrier, but examination of the stool from the suspect failed to demonstrate the presence of the typhoid germ.

Several outbreaks have been attributed to the milk supply, one notable instance being that at Rome where a number of cases were traced to the route of one milk dealer. A careful investi-

gation was made by this Departme
fection having been due to the mi
sanitary conditions surrounding th
dealers were discovered, which led
health board of sanitary rules an
sale of milk in the city of Rome.

An outbreak of mild typhoid fe
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outbreak was fully investigated by
partment and a full report will be
engineering division.

The danger of the introduction of
through the medium of the milk s
minimum by the rule of the State
requires the health officer to ascerta
on the premises where typhoid feve
sale or shipment of milk from the
time as all danger of infection is p

Diphther

This disease has not been so p
although many cases presenting littl
exhibiting the presence of the Kle
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as diphtheria. These mild cases h
been classed as simple inflamed sor
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infection has been repeatedly prov
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active measures to remove the baci
necessitating the removal of adenoids
in a stamping out of the disease in

There were 18,141 cases of diph
the maximum being reached during
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cases were reported. The persistence of the bacilli in the cultures from the throats of convalescent patients long after the disappearance of all clinical symptoms has been a frequent source of controversy between the quarantined families and the health officers, but in the majority of cases the quarantine has been maintained until negative cultures were obtained.

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The active co-operation of the he
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was reported to the State Departm
officer of another town. When th
health officer of Rome he succeeded
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for sometime, and speedily stamped
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health officers, as evidenced by the d
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having been diagnosed as prickly he
municipality and the patient allowed
distributing the germs on the way.

The difficulties encountered by
disease occurred in a mild form a
insurmountable in many places,
Batavia, requiring the most painst
health officers assisted by the med
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and prevent the further spread of th
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present is German measles, and ina
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voked it is difficult to make a diag
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owing to the varying statements of t
it has been the rule to give the pu
and advise that these cases be treate
ever the source of infection has been
of true scarlet fever are found exist

Scarlet fever had its greatest pre
March when more than 3,000 cases
its lowest point in August when b
which was increased in the month
usual, the reopening of the schools a
followed by an increasing number of
ing the need of medical inspection

to prevent the entrance of this disease but of the other communicable diseases which are chiefly spread through the close contact of the pupils in our schools.

Poliomyelitis

This disease from which but 137 cases were reported during the year 1911 was apparently eliminated from this State, as but two cases were reported during the month of December, 1911, but it became prevalent early in 1912, being reported with increasing frequency during January, 1912, when 36 cases were reported, and continuing prevalent with 25 to 50 cases reported each month until the warm weather of July, when 118 cases were reported. These were increased to 223 reported cases in August, reaching the maximum in September, when 253 cases were reported, and gradually decreasing in prevalence during October, when 176 cases were reported; as usual this disease appears to have become dormant during the winter months. Strange as it may appear, poliomyelitis, which has its greatest prevalence during the hot summer months, is practically a disease of countries which have cold climates rather than of countries in which the climatic conditions are mild. A total of 1,108 cases has been reported during the year and a careful study of the disease has been made in the western portion of the State where the disease has had its greatest prevalence.

Poliomyelitis became epidemic in the city of Buffalo during the month of July continuing throughout the warm months and gradually decreasing in the number of cases reported daily through the fall and early winter.

Courteously acceding to the requests of the State Commissioner of Health the Surgeon-General of the U. S. Public Health Service assigned Wade L. Frost, Passed Assistant Surgeon, to Buffalo and vicinity in order that a thorough investigation and study of this outbreak should be made. Three hundred and sixteen cases were reported from the city of Buffalo, all of which were thoroughly investigated by the local health authorities who rendered every assistance to the representatives of this Department and the investigator detailed by the Public Health Service.

The report submitted by the Public Health Service will give a full account of this outbreak.

but also by the extremely mild character o
has frequently led to error of diagnosis and
of many persons to the contagion before th
ment was invoked and the correct diagnosis r

Smallpox has been prevalent since the la
1911, when more cases occurred in the mon
during the preceding eleven months of that
continued into the year 1912, when 173 ca
January and 88 cases in February, continu
prevalence until the latter part of the year
cases were reported from Hancock, Delaware
gaining considerable headway owing to the f
was not recognized as smallpox until wides
occurred. Vaccination had been neglected by
inhabitants of that section, who were loath
malady was variola until several severe cases c
type occurred, when they flocked to the ph
vaccination. The wholesale vaccination whi
ticed, together with the isolation of all kn
cases, has resulted in a checking of the epide
of the State.

The same difficulty in controlling the dis
countered in the northern counties of the State
ing from Mineville, Essex county, where it
chickenpox until the consulting dermatologist
partment of Health visited there and pronou
fever from which many of the people were suffe
As in Delaware county, there has been consi
to vaccination encountered. Sporadic cases
been reported from all sections of the State, bu
of the patients with vaccination of all exposed
vented a general epidemic throughout the State

An outbreak which occurred in the city of H
by a medical officer of the State Department
adjoining town where the disease had existed fo
out any precautions being taken to prevent its
the erroneous diagnosis of chickenpox so fre
these mild cases. The disease did not gain m

Hornell, owing to the promptness with which the health officer assisted by the medical officer of this Department instituted measures of quarantine and vaccination of all exposed persons.

In sharp contrast to the speedy control of the outbreak in Hornell may be mentioned the long continued epidemic at Olean, where the most painstaking efforts of the health officer were nullified by the organized opposition to vaccination, fully demonstrating that the most rigorous quarantine of known cases of smallpox does not prevent its spreading among an unvaccinated population.

The slight epidemic which occurred in the city of Rochester furnished an additional proof of the value of vaccination as a preventive of smallpox, inasmuch as but two of the thirty-one cases reported had ever been vaccinated — one of them over twenty years previous and the other forty years.

A report of an epidemic of impetigo in Broome county having reached the State Department of Health caused an investigation to be made which resulted in the discovery of a number of cases of smallpox which were spreading and assuming the proportions of an epidemic. The health officer of the village being ill at the time, the medical officer from this Department visited the members of the board of health and urged the appointment of an acting health officer to quarantine the cases and vaccinate all exposed persons. The outbreak was speedily controlled when this action was taken by the local board.

The discovery by a medical officer of the State Department of Health, of a case of smallpox in the city of Schenectady led to the tracing of the source of infection to a mining district in the northern part of the State where the disease had been epidemic for some weeks. It required the services of a medical officer of the State Department of Health to suppress this epidemic in the mining district.

Another epidemic occurred in the township of Bombay, having been imported from Canada. This outbreak caused some uneasiness, as it threatened to invade the St. Regis reservation, owing to the fact that some of the Indians who reside and work in the village of Bombay were affected, but the promptness with which Health Officer Kingston quarantined and vaccinated all

danger of the disease which causes the death of so many children, and protect their young from all needless exposure to the disease.

There were 7,821 cases of whooping cough reported with a fatality of 680, while scarlet fever, which disease all parents and guardians fear, caused but 789 deaths, although 18,579 cases were reported.

Venereal Diseases

The several State institutions reporting to the State Fiscal Supervisor have continued to report venereal diseases to this Department during the past year.

Considerable educational work has been done by representatives of the Department in nearly every part of the State. Women physicians have lectured before audiences of their sex, while men physicians have presented the subject to organizations and audiences of men.

Much interest has been manifested throughout the State in this particular phase of public health work. The lectures have been well attended and heartily approved by those who have listened to them and have devoted more or less time to the study of the prevalence and ravages of the Black Plague.

Being desirous of ascertaining the opinion of the various health officers of the State as to the advisability of placing syphilis and gonorrhea among the reportable diseases, the Commissioner of Health addressed a communication to every health officer asking his opinion relative thereto. On account of the small number of responses received to this communication as well as the divided opinion entertained throughout the State it was decided not to make these diseases reportable but to continue a campaign of education against their prevalence.

The subject was thoroughly presented at the last State Conference of Health Officers by men of national reputation, and discussed with much earnestness and in detail by prominent sanitarians throughout the State.

Active measures are to be pursued in this campaign of education and such assistance as may be possible is to be contributed by the State Department of Health. In certain cities of the State houses of prostitution have been driven out resulting in an immediate and continued reduction in the prevalence of venereal

diseases. Other cities are anticipating a similar crusade and many are alive to the necessity of energetic measures being instituted against the ravages of these diseases.

In order to lend direct and practical assistance to certain localities of the State as well as to extend this special feature of our public health work, an expert has recently been appointed who will be available for this special purpose.

Ophthalmia Neonatorum

The efficacy of preventive measures has been fully demonstrated in the control of this disease, inasmuch as not a single case of ophthalmia in the new-born has been reported where the preventive solution furnished by the State Department of Health was used in the eyes at the time of birth. This, together with the hearty co-operation of accoucheurs, has resulted in a reduction of the number of cases of this disease to seventy-five.

The requests for supplies of the solution are increasing in number, fully proving that not only the physicians but also the midwives are using the preventive solution furnished free by the State Department of Health. No cases of the disease resulting in blindness have been reported during the year 1912.

Medical Officers

The aid of the medical officers has been more frequently requested by the health officers in cases of disputed diagnosis, and the promptness with which this Department has responded to all such requests appears to have been fully appreciated by the health officers who are handicapped in their efforts to conserve the public health and find that they are frequently compelled to rely upon the assistance of the State Department in the establishing and maintaining of quarantine over communicable diseases.

Special investigations of outbreaks of the communicable diseases have been made by the medical officers, often resulting in tracing the source of the infection, thereby enabling the Department to eradicate the same and prevent further spread of the infection.

Respectfully submitted,

WM. B. MAY, M.D.,

Director, Division Communicable Diseases

diseases. Other cities are anticipating a similar crusade and many are alive to the necessity of energetic measures being instituted against the ravages of these diseases.

In order to lend direct and practical assistance to certain localities of the State as well as to extend this special feature of our public health work, an expert has recently been appointed who will be available for this special purpose.

Ophthalmia Neonatorum

The efficacy of preventive measures has been fully demonstrated in the control of this disease, inasmuch as not a single case of ophthalmia in the new-born has been reported where the preventive solution furnished by the State Department of Health was used in the eyes at the time of birth. This, together with the hearty co-operation of accoucheurs, has resulted in a reduction of the number of cases of this disease to seventy-five.

The requests for supplies of the solution are increasing in number, fully proving that not only the physicians but also the midwives are using the preventive solution furnished free by the State Department of Health. No cases of the disease resulting in blindness have been reported during the year 1912.

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EPIDEMIOLOGY OF THE OUTBREAK OF POLIOMYELITIS IN BUFFALO, N. Y., 1912

EPIDEMIOLOGY OF THE OUTBREAK OF POLIOMYELITIS IN BUFFALO, N. Y., 1912

By WADE H. FROST, *Passed Assistant Surgeon,* and JAMES P. LEAKE, *Assistant Surgeon, U. S. Public Health Service*

The epidemiological study of the outbreak of poliomyelitis in Buffalo, upon which this report is based, was undertaken by the writers by direction of the Surgeon-General, U. S. Public Health Service, upon the request of the health authorities of the State of New York and the city of Buffalo. It was begun August 12, 1912, and continued, with an intermission of about ten days during the latter half of September, until November 7, by which time it was evident that the epidemic had ceased.

In order to obtain epidemiologic records a visit was paid, with the consent of the attending physician, to every reported case of poliomyelitis that was accessible, and a systematic inquiry made to ascertain such facts as appeared to have a bearing upon the origin of the infection. During the first weeks of the investigation, Dr. Jesse N. Roe, of the Ernest Wende Hospital, assisted in the collection of case records, for a considerable number of which we are indebted to him. Assistance was also rendered in this direction by Dr. E. A. Sharp in the course of his clinical study of the epidemic.

To the Commissioner of Health and his assistants, especially to Dr. F. C. Gram, Chief of the Division of Infectious Diseases and Vital Statistics, we are indebted for their co-operation, which alone rendered the work possible, for the use of all the necessary records of the Health Department, and for assistance in arranging many details.

Classification of Cases

In compiling the records obtained it has been our aim to exclude all cases in which the diagnosis of poliomyelitis was not satisfactorily established. A large proportion of the cases reported after

the study was begun were, during the acute state of illness, examined by Drs. Sharp and Russell, diagnosticians for the Department of Health, and in the classification of all such cases their diagnosis has been followed. In a certain number of cases not seen by the diagnosticians of the Department, and visited several weeks after the acute stage, it was impossible to make a complete examination or to obtain a clinical history sufficiently clear to fully justify a diagnosis of poliomyelitis. Such cases are included in the following tabulation as "suspicious" and are omitted from further consideration in this report.

In regard to cases classed as "abortive" it is believed that in all of these the diagnosis of poliomyelitis is fully justified, notwithstanding that they recovered without having exhibited definite paralysis.

Following is a summary of the cases reported:

Cases reported to the Department of Health, as poliomyelitis or suspected poliomyelitis, from January 1 to November 7, 1912....		335
Diagnosed "not poliomyelitis"...........................	26	
Diagnosis doubtful	12	
		38
Diagnosis confirmed — poliomyelitis		297
Cases classed as "abortive, terminating in recovery without definite paralysis"		16
Cases of poliomyelitis resulting in paralysis......................		281

The above is a statement only of the reported cases of poliomyelitis. It may be safely assumed that the number would be very considerably increased by the addition of unreported and unrecognized cases, especially of the milder types.

Course of the Epidemic

In Buffalo, as in other large cities, poliomyelitis is not a new infection. Authentic records may be obtained of sporadic cases dating back twenty years and more. The first recorded epidemic in the city occurred, however, in the summer and fall of 1910, when some sixty cases were discovered. The next year, 1911, there were but nine cases reported. In the following summary are given the dates of onset of the cases reported in 1912.

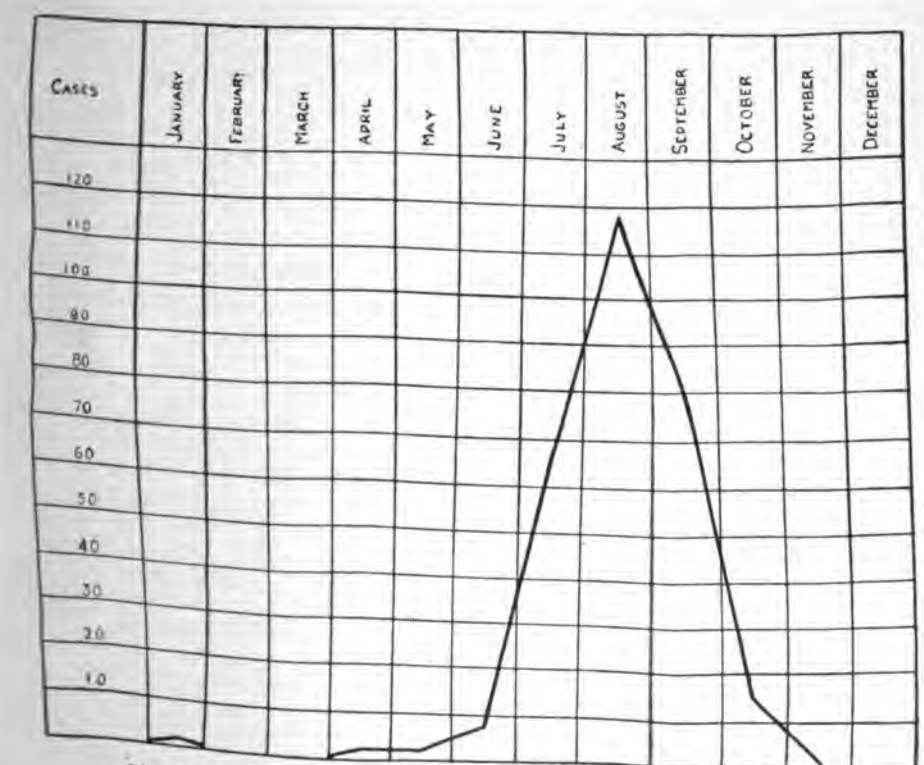

Chart No. 1. Onset of Cases, by Months; 294 Cases (See Table No. 1).

TABLE NO. 1

... of Onset of Cases of Poliomyelitis Reported in Buffalo, 1912

...ary	1
...ary	....
[illegible]	....
[illegible]	1
[illegible]	1
[illegible]	9
[illegible]	68
[illegible]	113
...mber	79
...er	16
...mber	1
	294

To follow the course of the epidemic in more detail, the following table and chart show the dates of onset of cases in ten-day periods.

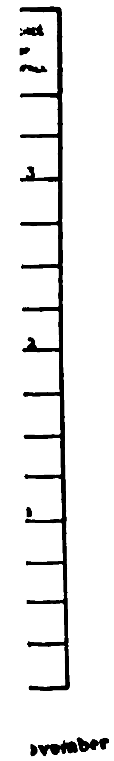

TABLE NO. 2

Cases with onset prior to June 1	3
Cases with onset June 1–10, inclusive	1
Cases with onset June 11–20, inclusive	2
Cases with onset June 21–30, inclusive	6
Cases with onset July 1–10, inclusive	11
Cases with onset July 11–20, inclusive	20
Cases with onset July 21–30, inclusive	34
Cases with onset July 31–August 9, inclusive	36
Cases with onset August 10–19, inclusive	52
Cases with onset August 20–29, inclusive	27
Cases with onset August 30–September 8, inclusive	37
Cases with onset September 9–18, inclusive	35
Cases with onset September 19–28, inclusive	17
Cases with onset September 29–October 8, inclusive	11
Cases with onset October 9–18, inclusive	4
Cases with onset October 19–28, inclusive	3
Cases with onset October 29–November 7, inclusive	1
Cases with onset November 8–17, inclusive	....
	*290

*...en cases in which the dates of onset could not be ascertained with ...st accuracy have been omitted from this summary.

TABLE NO. 1

Dates of Onset of Cases of Poliomyelitis Reported in Buffalo, 1912

January	1
February	....
March	....
April	1
May	1
June	9
July	68
August	118
September	79
October	16
November	1
	294

To follow the course of the epidemic in more detail, the following table and chart show the dates of onset of cases in ten-day periods.

TABLE NO. 2

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Cases with onset October 9–18, inclusive	4
Cases with onset October 19–28, inclusive	3
Cases with onset October 29–November 7, inclusive	1
Cases with onset November 8–17, inclusive	....
	*290

* Seven cases in which the dates of onset could not be ascertained with sufficient accuracy have been omitted from this summary.

From the foregoing it is evident that
gradual rather than explosive development,
almost uniform increase from the first of
August, then a gradual decline, interrupt
during the first half of September.

Curves showing the mean temperature a
for each ten-day period have been added t
cate the relation between weather condition
epidemic. Charts Nos. 3 and 4 have bee
parison between the weather conditions d
1912, and the normal temperature and rai
in Buffalo.

From the latter charts it is seen that th
generally cooler than usual. August was
while the mean temperature for September
normal. The more detailed chart (No. 2) s
mean temperature through the month of
rise in the first week of September. T
occurring toward the middle of Septembe
after the period of higher temperature, sug
conditions may have been to some exten
increase, although, on the other hand,
coincidence.

The rapid decline of the epidemic with
weather in late September and October is s
considered as necessarily due to the lower t
communities epidemics have been known t
equal abruptness before the onset of cool v
still other communities, to continue throu
cool weather.

As regards the relation between rainfall
epidemic it is of interest to note that the m
lence, August, was a month of unusually
uniformly distributed. There is, then, n
excessive prevalence of dust was an importa
tion of this epidemic.

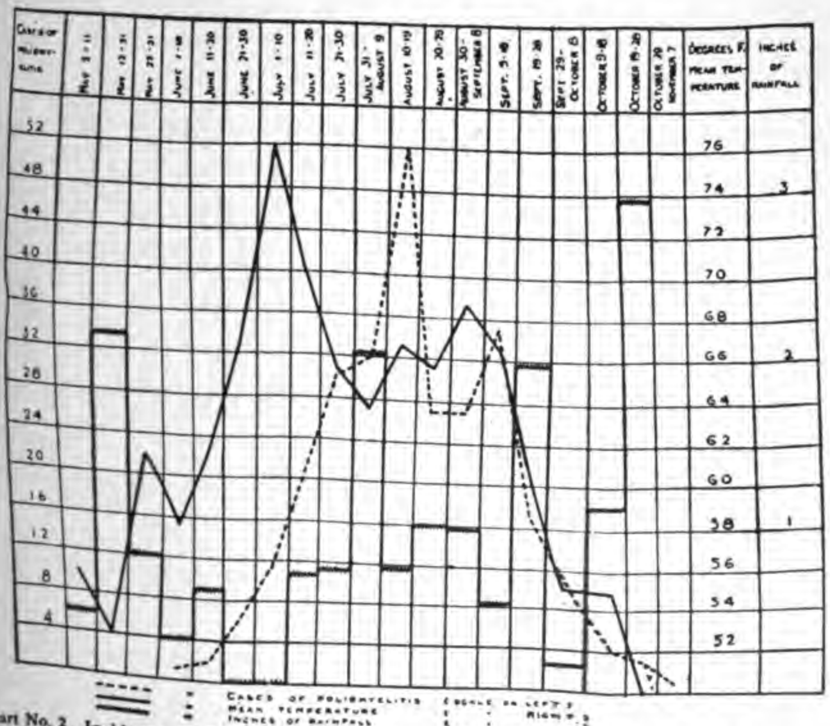


Chart No. 2. Incidence of Poliomyelitis in Buffalo, by Ten-day Periods, from May to November

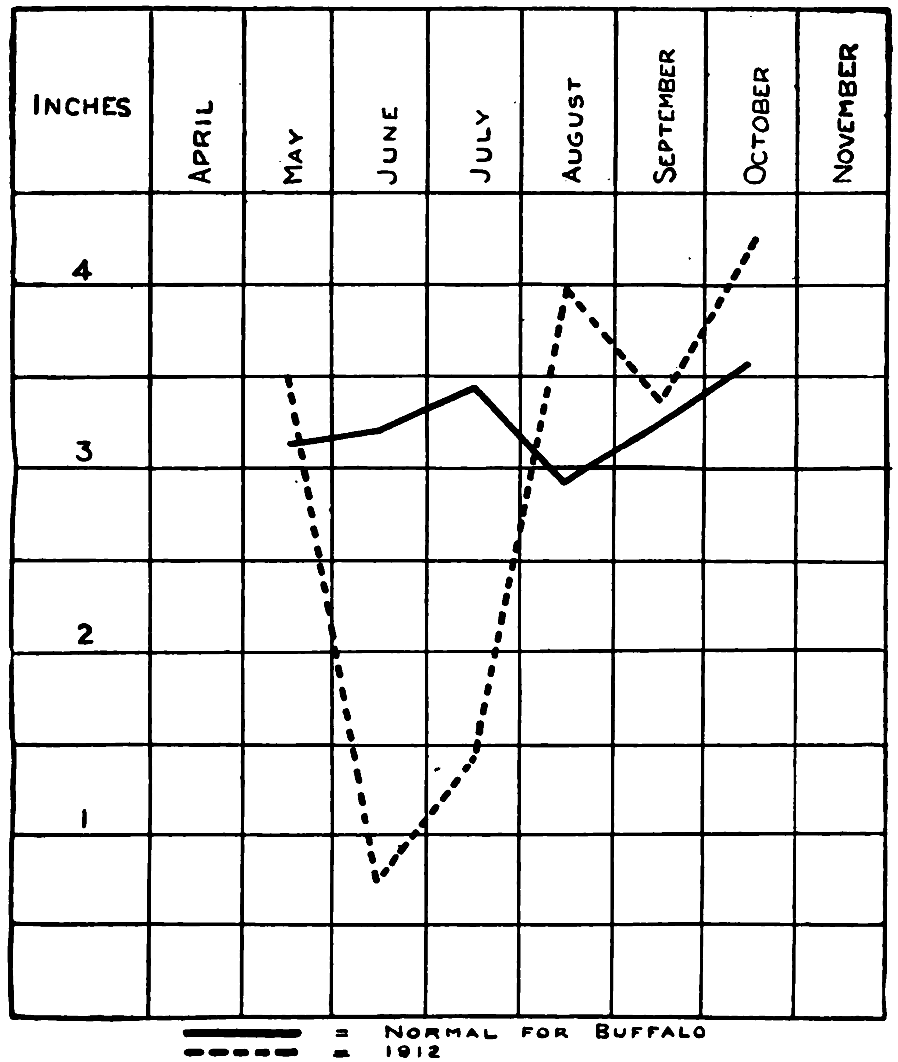


Chart No. 3. Monthly Precipitation, in inches, at Buffalo, N. Y.

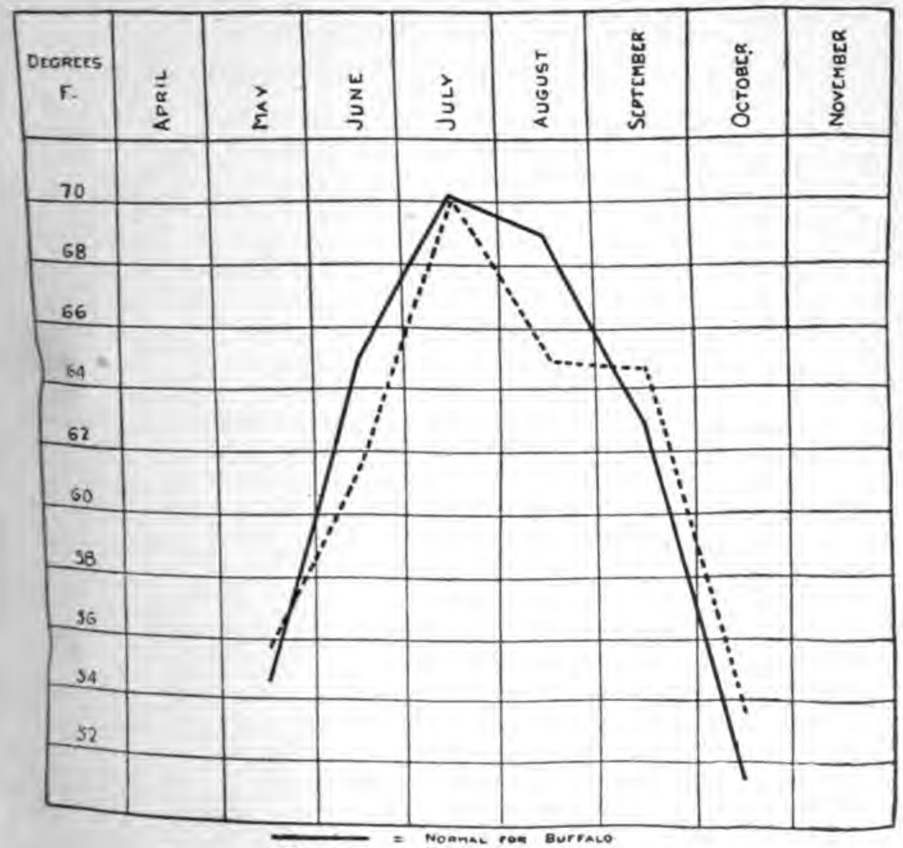


Chart No. 4. Mean Monthly Temperatures, at Buffalo, N. Y.

Geographic Distribution

As shown by the accompanying map, cases occurred in all parts of the city. The distribution of cases in various sections is better shown by a study of the number of cases occurring in each of the wards.

The following table compiled to show the distribution of cases by wards shows also, for each ward, the incidence in proportion to the total population and the density of population.*

TABLE NO. 3

Distribution of Cases of Poliomyelitis in the City of Buffalo by Wards

WARD	Total population	Population per acre	CASES OF POLIOMYELITIS	
			Number of cases	Cases per 10,000 of population
1	17,947	10.8	10	5.6
2	9,127	17.2	9	9.8
3	16,505	37.5	18	10.9
4	22,639	4.9	12	5.3
5	12,644	54.9	6	4.7
6	11,848	65.8	17	14.4
7	14,462	62.9	10	6.9
8	32,474	63.7	9	2.8
9	20,157	11.7	11	5.4
10	14,711	61.3	9	6.1
11	22,872	65.3	10	3.9
12	24,542	13.3	24	9.8
13	9,925	55.1	8	8.0
14	11,907	51.8	8	6.7
15	19,385	40.4	9	4.6
16	21,901	21.9	16	7.3
17	13,636	2.7	10	7.3
18	21,522	7.6	20	9.3
19	17,219	12.6	15	8.7
20	18,870	27.0	14	7.4
21	13,804	23.8	5	3.6
22	12,136	25.3	10	8.2
23	8,925	34.6	5	5.5
24	15,479	46.9	3	1.9
25	19,016	41.3	25	13.1
Total	423,711	....	293	6.9

* The figures as to ward population, area and density of population are from a ward-map of the city of Buffalo, the Matthews Northrop Co., Buffalo, 1911. The population given is that of the census of 1910.

TABLE NO. 4

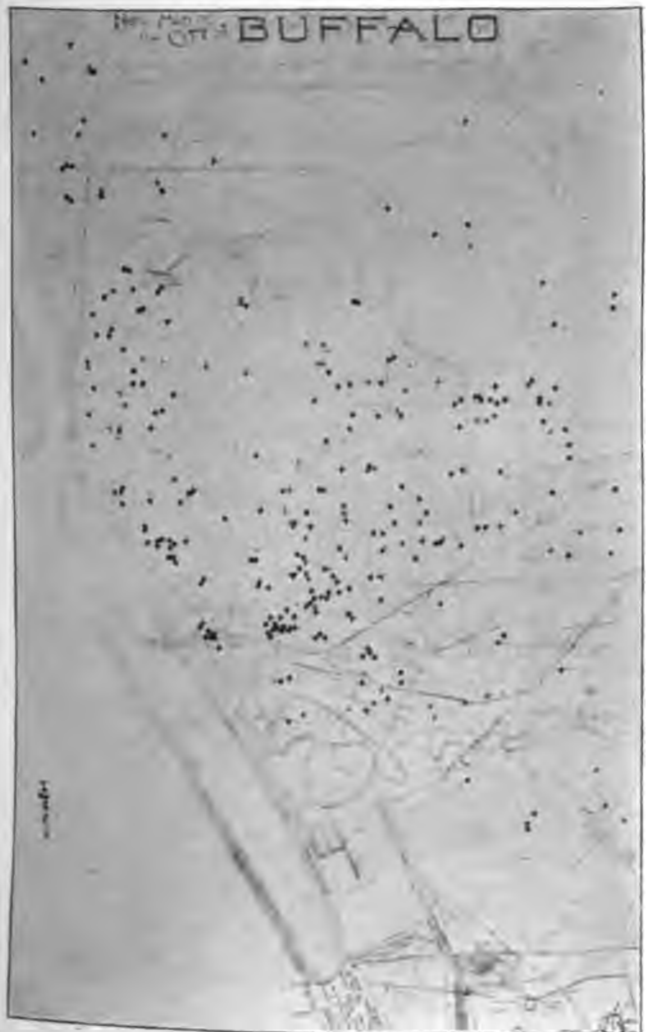
Comparison of Five Wards Showing Largest Proport and Five Wards Showing Smallest Proportion Respect to Density of Population

WARD NUMBER	Cases per 10,000 of population	Total population	Area,
Five wards with largest proportion of cases			
6	14.4	11,846	
25	13.1	19,016	
3	10.9	16,505	
2	9.8	9,127	
12	9.8	34,542	
Total	11.4	81,036	
Five wards with smallest proportion of cases			
24	1.9	15,479	
8	2.8	32,474	
21	3.6	13,804	
11	3.9	22,872	
15	4.6	19,385	
Total	3.5	103,964	

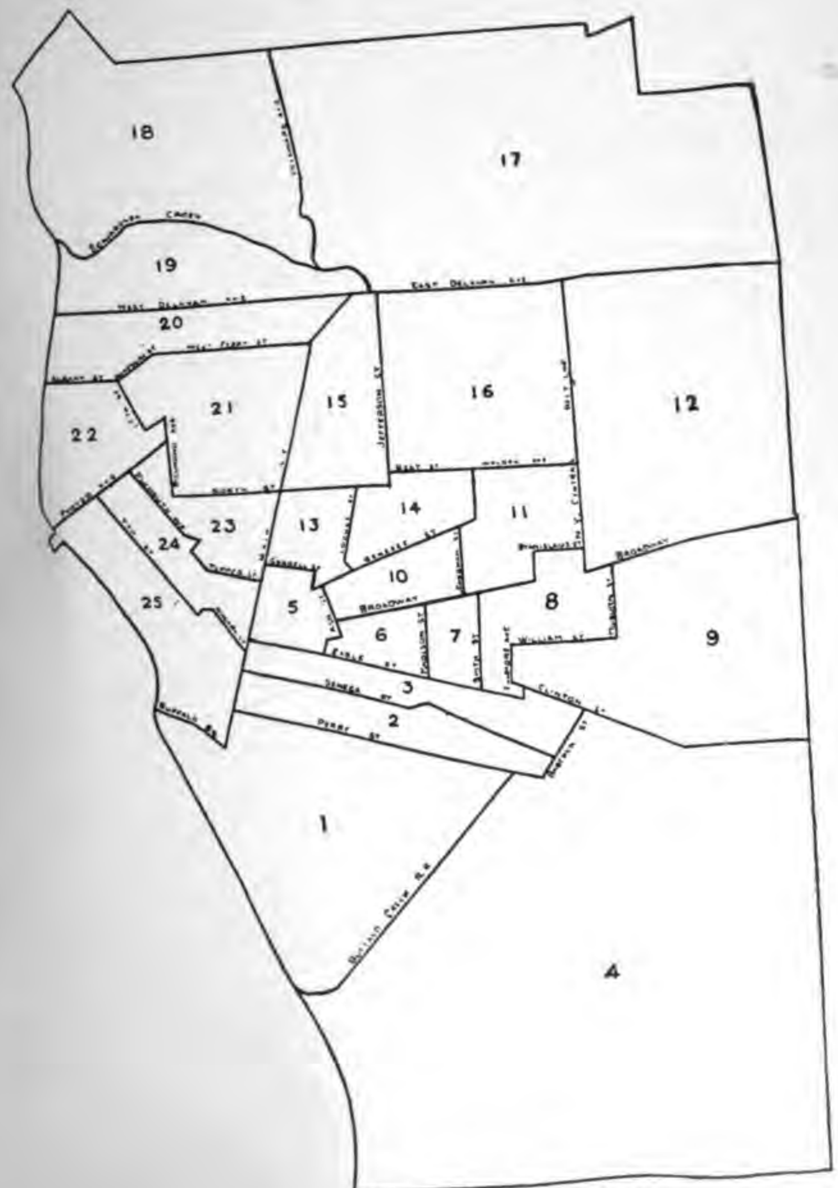
The incidence of cases in proportion to populat widely in the different wards. Also the relation of population and the prevalence of poliomyelitis Of the five most densely populated wards only one a proportion of cases above the average; while tv least, densely populated wards (wards 7 and 1 excess of cases above the average.

Grouping together the five wards with the l of cases, and the five with the smallest proportio these groups in respect to density of population, i No. 4) that the average density of population i great in the five wards with the smallest propo

A close study of the location of cases at vario the epidemic brings out the interesting fact tha tions of the city the disease reached its grea different periods. The following table (No. 5) showing the occurrence of cases by months in well illustrate this, showing that in certain secti epidemic had already reached its maximum a other sections were at all affected.



Map of Buffalo, Showing Distribution of Poliomyelitis.



Map of Buffalo, Showing Wards.

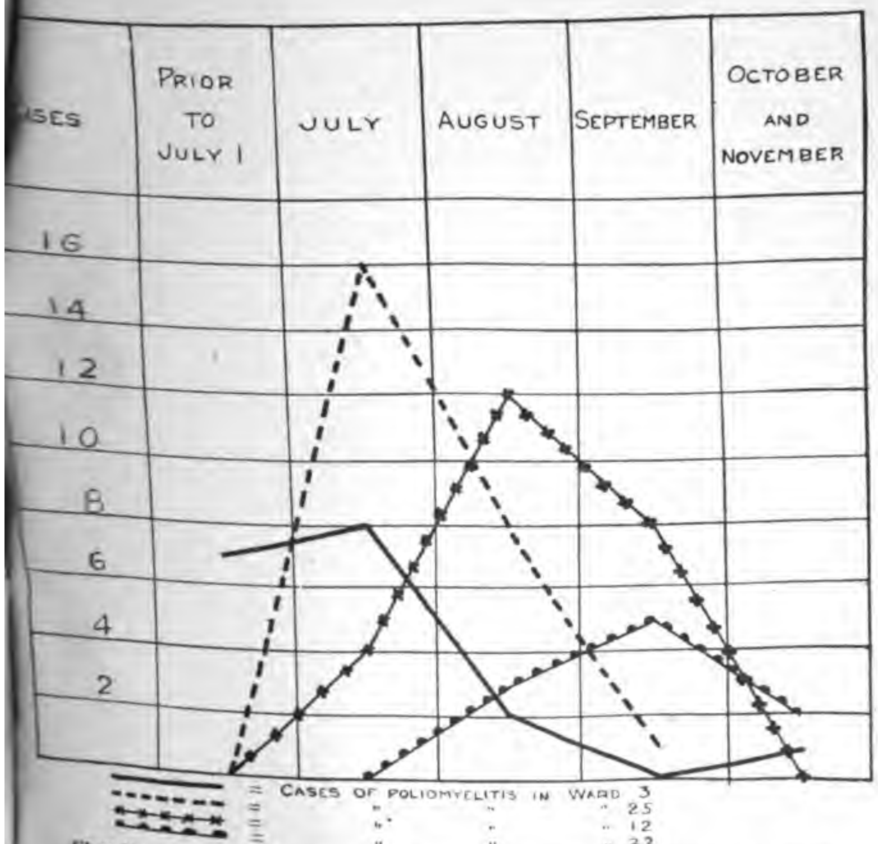


Chart No. 5. Showing Incidence of Poliomyelitis, by Months, in Various City Wards.

TABLE NO. 5

Occurrence of Cases of Poliomyelitis by Months in Various Wards

WARD	Prior to July 1	July	August	September	October and November	Total
3	7	8	2	....	1	18
25	....	16	8	1	....	25
12	....	4	12	8	....	24
22	....	....	3	5	2	10

Distribution of Cases Among Various Elements of the Population

Some interesting and significant facts are shown by considering the incidence of cases among the various elements of the population classified according to nationality, according to environmental condition, and according to age and sex.

Of the various nationalities represented in the population of Buffalo, the Italian, Polish and Jewish are the most distinctive, living for the most part in colonies of their own, and mingling comparatively little with people of nationalities other than their own. This is especially true of the Italians, who are mostly rather recent immigrants, speaking English but little. The largest Italian settlements are in the lower end of the 25th ward, and in the 3d ward. These settlements are the most congested and unclean section of the city.

The Polish and Jewish population live chiefly in the 6th, 7th, 8th, 9th, 10th, 11th and 12th wards under conditions which appear to be, on the whole, better than in the Italian settlements, but well below the living conditions of the native born and more completely Americanized population.

The other nationalities largely represented, namely, the German, Irish, English, Canadian and Scandinavian are more widely dispersed and are mingled more intimately with the native born population.

The accompanying table and chart (No. 6) indicate that the epidemic developed first among the Italian population, reaching its maximum among them in July.

The curves showing the development of the epidemic among the other nationalities are approximately coincident, reaching their maximum in August at a time when the prevalence of poliomyelitis among the Italian population had markedly declined.

TABLE NO. 6

Nationality of Parents of Patients with Poliomyel

	January to May	June	July	August	September	Octot
Italians	1	4	18	5	2	....
Polish	......	......	1	11	7	...
Jewish	......	1	1	7	2	...
German	......	......	4	19	8	
German-American	......	1	9	19	20	
American	1	......	12	33	21	
All other	1	3	23	34	18	
Totals	3	9	67	118	78	

It has not been practicable as yet to estimate the ir cases among the various nationalities in proportion t number of each nationality in the city. Such rough e have been made indicate a prevalence proportionat among the Italians than among the other eleme population.

The classification of cases according to age and sex in the following table:

TABLE NO. 7

Age and Sex Distribution of Paralytic and Fata

AGE GROUPS	Total Paralytic and Fatal Cases				
	Number of cases in each group			Percentage in each age group	N
	Male	Female	Total		
Under 1 year	15	8	23	8.1	
1 to 5 years	122	77	199	73.0	
5 to 10 years	15	23	38	13.9	
11 to 15 years	3	2	5	1.8	
16 to 20 years	4	2	6	2.2	
Over 20 years	1	1	2	0.7	
Total	180	113	273	100.0	
Children, age and sex not specifically ascertained	....	....	8	....	
	....	....	281	....	

NOTE.— The 16 cases classed as " abortive " recovering without definite rom this table.

The age-incidence shown above is quite simila monly found in epidemics of this disease.

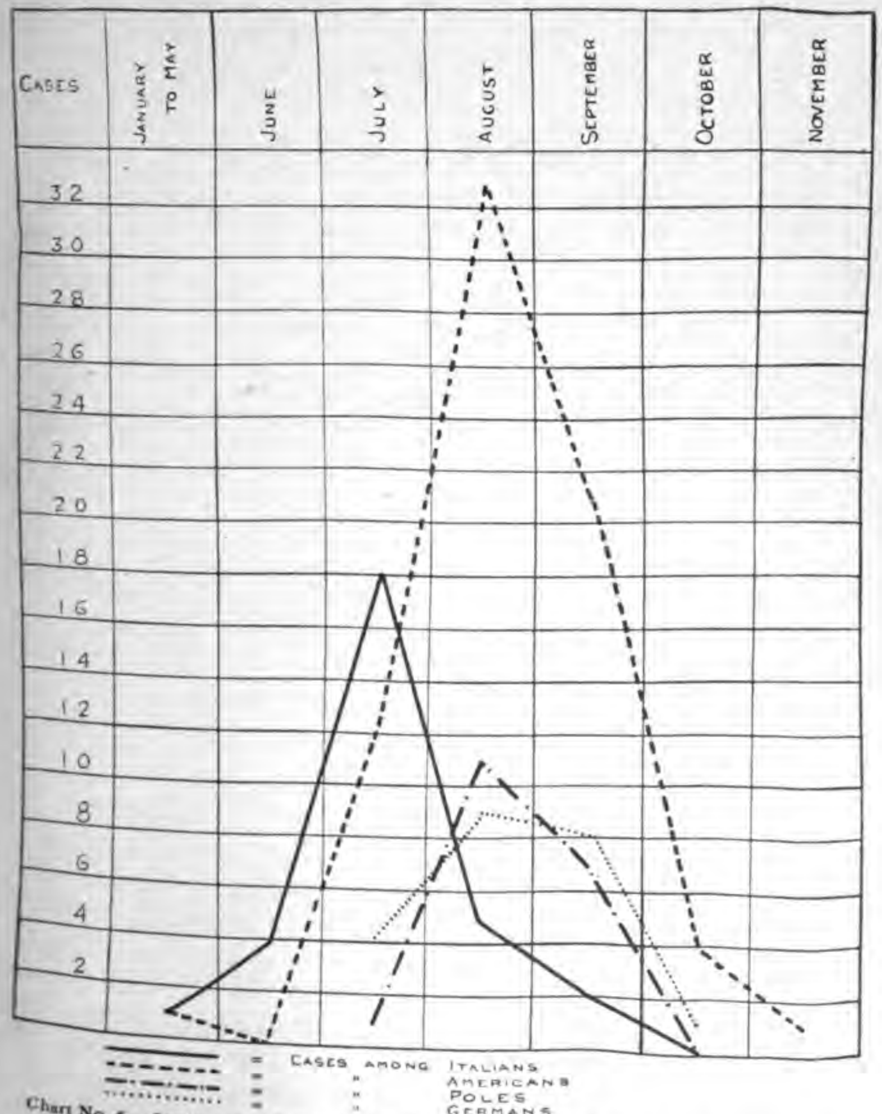


Chart No. 6. Incidence of Poliomyelitis, by Months, in Persons of Various Nationalities.

A better idea of the enormously greater incidence in children may be obtained by comparing the number of cases among them with the estimated number of children in the total population. According to the most recent statistics that have been available, children under ten years of age constituted 20.2 per cent. of the total population of New York State in 1900.* Estimating liberally that children under ten years of age may have constituted 25 per cent. of the population of Buffalo, the following calculations give some idea of the relative incidence of poliomyelitis among persons under ten years of age, and those over that age.

TABLE NO. 8

Discussion of Age Statistics

RATE OF INCIDENCE OF POLIOMYELITIS AMONG PERSONS OF VARIOUS AGES

	Population of Buffalo, census of 1910	Cases of poliomyelitis (of specified age)	Cases per 100,000 population
All ages	423,715	273	64.1
Under 10 years (estimated)	105,929	257	242.6
Over 10 years (estimated)	317,786	16	5.3

According to this estimate poliomyelitis was proportionately about forty-six times more prevalent in children under ten years of age than in older persons.

Environmental Conditions

In studying the epidemiology of any disease it is important to take account of the immediate environment of each patient, the general sanitary conditions of the premises occupied. Under this term are considered living space, ventilation, light, sewage disposal, the presence or probable presence of vermin, and general cleanliness. The last named is an important consideration, because, generally speaking, the less the attention paid to careful habits of cleanliness of person and surroundings, the greater is the opportunity for the interchange of secretions and excretions from person to person. Diseases whose incidence depends largely upon the conditions arising from overcrowding and improper feeding;

* Bulletin No. 13, Bureau of the Census, Department of Commerce and Labor, Washington, 1904.

diseases transmitted by insects such as lice, bed flies, whose prevalence in the house is permitted less and the uncleanly, and diseases transmitted from person to person, are generally more preva who live under what may be called bad sanitary

The following table gives the sanitary conditio premises where cases of poliomyelitis occurred or

TABLE NO. 9

General Sanitary Conditions on Premises Wher myelitis Occurred or Were Cared 1

Excellent in	......
Good in	......
Fair in	......
Poor in	......
Not noted in	......

There is perhaps a somewhat excessive prevalen living under poor sanitary conditions, since prob per cent. of the total population of the city live which may be so classed. On the whole, however among the various social classes, so far as it is sh summary, is sufficiently uniform to indicate th commonly associated with ill-kept and unclean pr predominant factor in causing poliomyelitis.

It has frequently been suggested that domest play an important part in the spread of poliomye gestion is based chiefly upon the frequent obs epidemics of poliomyelitis, of paralytic affect animals, dogs, cats, horses, cattle, swine, rabbits an no evidence has been adduced to show that these tions are etiologically related to human poliomyeli ing that various paralytic affections of animals mon, it may well be that the frequency with whic have been observed during human epidemics of attributable largely to the increased interest whic such times.

The only instances of any association with sick animals were the following:

Case No. 12.—A dog next door was sick a short while prior; paralyzed on one side.

Case No. 13 and 13-a.—A dog on the premises died in convulsions a month later.

In six cases it was stated that cats kept on the premises or on neighbors' premises had recently been sick or died without evidence of paralysis.

In three cases considerable numbers of chickens on the premises or near by had recently died.

One case occurred near a veterinary hospital.

The instances above cited, in view of their small number, the rather remote association between the sick animals and the patients and the indefinite nature of the illness of the animals can hardly be considered as significant.

It is, of course, possible that domestic animals, themselves showing no indication of paralytic disease, may spread the infection of poliomyelitis in man, acting either as passive carriers of the virus, or as the usual hosts of the parasites which may transmit the infective agent to man. In the investigations of the Massachusetts State Board of Health attention has been called to the constantly greater prevalence of poliomyelitis in towns where domestic animals are relatively numerous in proportion to the population.

In the investigation of each case in Buffalo, inquiry was made as to the number and kind of animals kept on the premises. Domestic animals of some kind were found on the premises in 130 of the cases investigated. These animals were:

Cats in	62 cases
Dogs in	50 cases
Chickens in	40 cases
Birds in	15 cases
Horses in	8 cases
Ducks in	3 cases
Rabbits in	1 case

In practically all cases, even where no animals were kept upon the immediate premises of the patient, they were to be found on

neighboring premises. It was quite exceptiona find a house more than one block distant from While there was, therefore, more or less oppc patient to have been to some extent associated wit animals, there is no evidence that the disea prevalent among those most intimately associate

Food and Drink

In looking for the source of a sudden epidem turns to the great common carriers of certain ir milk and other raw foods. A consideration whic though not of itself conclusive, is that this epidemic the explosive character which would be expected due to sudden infection of a water or milk supply.

As indicating that the water-supply of Buffalo cause of the epidemic, a considerable number of the breast-fed infants who drank little or no water; n them were young children still on a milk diet and d paratively little water; and finally, the outbreak was limited to Buffalo. The disease prevailed almost with equal severity in other towns of western New Y the water supply is from altogether different sources.

As regards the milk supply, suspicion is directed t because of the preponderating incidence of the disease a dren at the age when milk forms their chief diet.

The investigation showed that 225 patients used mo of raw milk from the following sources:

From licensed dairies	
From local groceries	
From private sources (own or neighbors' cows)	
	2

Forty patients used no raw cow's milk at all, viz.:

Used no milk at all	4
Used only boiled, condensed or evaporated milk	24
Exclusively breast fed	12
	40

In the remaining 32 cases satisfactory information as to the use and sources of milk supply was not obtainable.

The 209 patients supplied by city dairies obtained their supply from 120 different dairies, among which the cases were distributed as follows:

	Dairies
Dairies supplying 1 patient each	85
Dairies supplying 2 patients each	19
Dairies supplying 3 patients each	6
Dairies supplying 4 patients each	4
Dairies supplying 5 patients each	2
Dairies supplying 6 patients each	1
Dairies supplying 7 patients each	1
Dairies supplying 15 patients each	1
Dairies supplying 23 patients each	1

The dairies having the largest number of cases among their customers are generally large dairies. A careful comparison of the dairies with more than two cases among their customers, taking into consideration the amounts of milk sold by each, showed that there was no significantly excessive incidence of poliomyelitis among the patrons of any one dairy.

The sources of milk supply of the patients were so various as to eliminate all probability of milk having been an important factor in the spread of the epidemic, it being extremely improbable that so many different sources should have been simultaneously infected.

As to foodstuffs other than milk, those which fall most under suspicion are fruits and vegetables, which are eaten raw. It is virtually impossible to trace back to their ultimate sources the fruits and vegetables which are consumed in a large city. The ultimate sources of supply must, however, be very numerous for a city of the size of Buffalo. It is highly improbable that fruits and vegetables from any single source should have been distributed widely enough to cause this outbreak, and equally improbable that a large number of the sources of supply should have been infected at the same time.

There is, of course, the possibility that fruit and vegetables becoming infected in passing through the hands of local dealers may have contributed to the spread of the infection after it had been

introduced into the city. Even this, however, could not ac the whole epidemic, since a considerable number of the were infants who had eaten no raw fruits or vegetables notwithstanding that inquiry was always made as to dealer supplying the green groceries and fruits used patient, no evidence was obtained showing an excessive nu cases among the patrons of any dealer.

Contact with Infected Persons

In studying the evidence of contagiousness attention given to two points, first, the number and proportion of giving a history of contact with previous cases; and seco proportion of cases developing among well persons known been in intimate contact with patients in the acute st infection.

Histories of contact with previous acute cases of polion were obtained as follows:

1. Direct contact:
   - (a) With previous authentic paralyzed case in acute or convales cent stage ....
   - (b) With previous authentic abortive case in acute stage........
   - (c) With previous authentic chronic case of more than six months' standing ....
   - (d) With previous suspected case of poliomyelitis..............

   Total ....

2. Indirect contact:
   - (a) With previous authentic paralyzed case.....................
   - (b) With previous suspected case.............................

   Total ....

In addition, indirect contact, generally very casual, *with* a vious case was said to have been probable but not defini recalled in nine cases.

Altogether only 49 (18 per cent.) out of 273 investiga paralytic cases gave any history whatsoever of contact, howe slight, direct or indirect, with any previous case which mi reasonably be considered a case of poliomyelitis.

Only fourteen instances of direct contact and twelve instances of indirect contact with previous definite cases may be considered sufficiently authentic to have a definite significance. In the great majority of the cases the family had absolutely no knowledge of any possible contact between the patient and any previous case. It may be assumed that in a certain number of cases there had been some such contact either unknown to the patients' families or denied by them, but it is believed that these instances would be, in the aggregate, comparatively few.

The question may now be considered from the opposite point of view, namely the occurrence of poliomyelitis among persons known to have been in intimate contact with acute cases. Of the 273 paralytic cases investigated, three occurred in institutions. One of these patients was a nurse in a general hospital; the second a patient in the children's ward of another general hospital, and the third an inmate of a large school for boys. It is evident that all of these patients must have been in contact with a considerable number of people during the onset of their attacks, yet there was no other case in any of these institutions.

The remaining 270 cases occurred in 267 families, comprising a total of 1,513 people, of whom 762 were children under sixteen years of age. Deducting one person from each family as the "primary" case there remained exposed to infection by association with these, 1,246 persons (1513–267). Among these, cases of poliomyelitis, abortive poliomyelitis and suspected poliomyelitis occurred as shown in the following table:

TABLE NO. 10

Incidence of Poliomyelitis, Abortive Poliomyelitis and Suspected Poliomyelitis in 267 Families

	Total in family	Sick, primary	Exposed to infection from primary cases	TOTAL SICK, SECONDARY		
				Poliomyelitis	Abortive poliomyelitis	Suspected poliomyelitis
				Per cent.	*Per cent.*	*Per cent.*
Under 16 years of age....	762	260	502	3,=0.6	3,=0.6	22,=4.4
Over 16 years of age.....	751	7	744	....	....	1,=0.23

Considering the small percentage of these intimately exposed persons who developed the disease, there is, in these figures, indubitable evidence that poliomyelitis in this outbreak was not highly contagious in the ordinary sense of the word. If contagious at all, it must have been only slightly so, the infective agent being either rarely transmitted from the sick to the well, or else finding among the latter few susceptible individuals.

In the majority of cases it was found that a variable number of persons outside of the immediate family of the patients had been exposed by visiting the homes of patients before isolation had been ordered, and in not a few instances it was found that the patients themselves had been carried around in railway coaches and street cars, and sometimes taken to public gatherings during the acute stage of their illness. On the whole, notwithstanding the conscientious efforts made to isolate all cases, there was abundant opportunity for the infection to have been widely disseminated by direct and indirect contact, even from the recognized and reported cases.

Of the 263 houses in which these cases occurred, more than half (142) were occupied by two or more families, in some instances by twenty or more families. Altogether there were in these houses 350 additional families other than the families of the patient first attacked in each house. Among these 350 families residing in such immediate proximity to cases of poliomyelitis there occurred subsequently four cases of poliomyelitis in three families. In the remaining 347 families no known cases developed, thus again indicating how rarely was poliomyelitis transmitted to those in the immediate vicinity of acute cases.

Inquiry was made to ascertain what public places each patient had visited shortly prior to illness. The tabulation of all the places which had been visited would lead into much detail. Suffice it to say that many of the patients had not been out of the immediate vicinity of their residences for several weeks prior to their illness, and of those who had been away no considerable proportion had visited any one place or locality. The infection was not, therefore, confined to any particular section or locality but must have been very widely disseminated throughout the city to have reached so many persons moving in circles not touching in any discoverable common point.

Relation to School Attendance

In considering the possible influence of schools in disseminating the infection the cases may conveniently be divided into those occurring before and those occurring after the opening of the schools of the city. In cases investigated before as well as after the opening of the schools, records were obtained relative to the school attendance of each patient and other members of the family.

These records embrace 286 cases (paralytic and abortive) of which 202 occurred prior to the opening of the schools, September 3, and 84 on or after that date.

Of the 202 cases occurring before September 3, 13.9 per cent. were in children entered in schools. Of the 84 cases occurring after the opening of the schools 29.7 per cent. were in children attending schools, either public or private.

The 202 cases with onset prior to the opening of the schools occurred in 197 families of which 110 (55.7 per cent.) had one or more members entered in school.

The 84 cases with onset on or subsequent to September 3 occurred in 83 families, of which 59 (71 per cent.) had one or more members in attendance at school.

The increase after September 3 in the percentage of cases among school children and of families having members at school suggests that the schools, after this date, played an appreciable part in the spread of the infection.

The grouping of cases in the various schools is shown in the following summary:

Number of Families in Which Poliomyelitis Occurred Attending Various (Public and Private) Schools Prior to September 3

	Schools	Equals, per cent.
Poliomyelitis in 1 family	42	60.
Poliomyelitis in 2 families	19	27.1
Poliomyelitis in 3 families	3	4.3
Poliomyelitis in 4 families	2	2.9
Poliomyelitis in 5 families	3	4.3
Poliomyelitis in 6 families	1	1.4
Total	70	100.0

On and After September 3

Poliomyelitis in 1 family..........................	
Poliomyelitis in 2 families..........................	
Poliomyelitis in 3 families..........................	
Total	

It is seen from the above that after the opening there was no significant grouping of cases among t any particular schools. In fact, the cases occurrin time are rather more uniformly distributed among schools than were the cases occurring in the summer n the schools were closed.

It would appear then that if the schools did play a able part in disseminating the infection after their ope not so much from recognized as from unrecognized infection among their patrons.

Evidence of Insect Transmission

In the investigation of this outbreak it was not possibl a systematic entomological survey of the environment patient, and inquiry as to the prevalence of various insect be expected to elicit accurate information. In regard to insects such as lice, bedbugs and fleas, whose presence in is very commonly and naturally denied, inferences as t probable access to poliomyelitis patients must be drawn from common knowledge of the usual habits and haunts o insects, and a general knowledge of the environment of patient. The occurrence of a very considerable proportion of among persons living under good sanitary conditions is of sufficient to practically exclude such insects as lice and bed from consideration as important factors in the spread of this in tion. While it does, of course, happen that these insects are o sionally found in well-kept houses their presence under such cor tions is very rare as compared to their prevalence in squalid s roundings. We would expect a disease transmitted largely either of these insects to be characteristically and distinctly

disease of the slums; and this is, in fact, the case with typhus fever, which is transmitted by the louse.

The common houseflies and fleas are not so distinctly restricted in their distribution, but these, too, are generally much more prevalent in the ill-kept surroundings of the poorer classes. It is probable that both houseflies and fleas may have had access to every case of poliomyelitis in the city. They cannot, on the evidence at hand, be excluded from consideration as possible factors of importance in the spread of this infection, although it would be expected, if the disease were transmitted solely or chiefly by either of these hosts, that the cases would have been more distinctly grouped in certain localities where the insects were obviously most prevalent.

The insect which falls most under suspicion as a possible carrier of poliomyelitis is the common stable fly (stomoxys calcitrans). Brues and Sheppard were the first to call attention to this fly as a possible agent in the spread of poliomyelitis. According to their observations in Massachusetts this was the only biting insect constantly found in the immediate vicinity of poliomyelitis patients. Since the recent demonstration that poliomyelitis may be transmitted from monkey to monkey by the bites of these flies, their possible importance in the natural transmission of the disease demands the closest attention.

Observations as to the prevalence of stomoxys in Buffalo were made only during the month of October. During this period, in the investigation of over 100 cases, in all sections of the city stomoxys were constantly found upon the premises or in the immediate vicinity of every patient. Only very rarely, however, were these flies found in the interior of patients' houses. As a rule, even in cold and rainy weather, they were found only out of doors, often around doorways and windows, but very seldom inside. During October the abundance and activity of stomoxys decreased very markedly. Whereas, during the early part of the month they were very common and active; by the first of November they were few in number and usually very sluggish. The decline of the epidemic very closely coincided with the decreased prevalence and activity of these insects.

In no instance was a history obtained of the patient or member of the family having been severely bitten by these flies. In the great majority of cases biting flies had not been noticed at all.

In view of the observed prevalence of stomoxys in Buffalo, and what is known of their habits, it is entirely probable that every person who developed poliomyelitis had recently been bitten by one of these flies; but equally probable that the remainder of the population were likewise bitten. In this connection it should be noted that among the class of people most exposed to the bites of stomoxys, namely hostlers, teamsters and attendants at stockyards and slaughterhouses, there was not a single recognized case of poliomyelitis. Also numerous instances were noted where only a single case of poliomyelitis occurred in a locality where stomoxys were extremely abundant and young children numerous.

In the present imperfect state of our knowledge as to the conditions necessary for the transmission of experimental poliomyelitis by stomoxys calcitrans, it is premature to attempt conclusions as to the role which this insect may have played in this outbreak.

The facts presented, while not inconsistent with the hypothesis that the disease was transmitted chiefly through this insect, do not appear to offer any specific evidence that such was the case, being equally consistent with the hypothesis that the infection was chiefly disseminated by more or less direct contact from person to person.

Summary

The study of this outbreak has developed nothing new or distinctly unusual in the epidemiology of poliomyelitis.

In general characteristics and course this epidemic was similar to those which have been studied in other cities. An infection presumably present in the city for many years became progressively more prevalent without discoverable specific cause. From a somewhat ill-defined focus, chiefly among the Italian population, in June and July, the epidemic spread over all sections of the city, attacking, however, only about one in 1,400 of the population, those attacked being almost exclusively children with a very few young adults.

The outbreak cannot be ascribed to purely local causes, for the reason that outbreaks of equal severity occurred in other localities in the State at about the same time. Nor can it be ascribed to any

tive agent is disseminated chiefly from sourc recognized cases. The only demonstrated sou other than persons suffering from clinically reco litis, are those suffering from slight clinically and passive human carriers. While it is quite of possibility that domestic animals or insects n sources or reservoirs of infection, there is at whatsoever that such is the case.

Finally, as regards the demonstrated occu human virus-carriers, analogy with other infect pares us to expect that the virus of poliomyelitis, upon the mucous membranes of a healthy pers there without causing a true infection of the in without necessarily reaching the interior of the ever, difficult to understand how the virus, if in circulation by a biting insect, could so multiply through the mucous membranes without caus reaction.

rectly or to make intelligent reports. Be
ports turned in it was decided to tabulate

The results of this tabulation shows th
number examined was 124,626 or 29.9 pe
ment outside the 49 cities. The total nun
dren found in the 124,626 examined wa
per cent. of the number examined.

Of those examined 121,693 were over se
had visual as well as all the other tests ma
instructions, some of the teachers examined
dren under seven years of age. This is n
curately with test cards.

As heretofore the tests have included th
focusing power; a test as to whether the
had any discharge or squinted; whether the
swollen or scaly; whether the eyes pained or
or the children suffered from daily or weekl

They examined also the acuteness of he
had earaches or a discharge from the ear. T
to observe whether the children were subject
had catarrh; were mouth-breathers or had de
were also supposed to note whether the chi
sufficiently nourished, a truant or below his

The highest percentage of defects, 29.7 p
in teeth. This percentage is much too low, as
show a percentage of 46.7 per cent., and in
schools an examination of the reports of 23.
schools shows a percentage of about 50 hav
Next to the teeth the largest number of de
distant vision, 25.8 per cent.

Defects of distant vision remained at alm
between the ages of 7 and those over 16; but t
ing power drop 3 per cent. in those over
Another notable fact, corresponding to those
York schools, is that the percentage of defe
of the eyes, decreases with the age. In the de
there was no decrease in those having colds
catarrh as they grew older.

Curiously enough there was an *increa* of 50 per cent. in those reported as ha Backward children increased 62 per cent. those having defective hearing 16 per ce

One of the notable things brought out marked increase from .72 per cent. in th to 2.4 per cent. in those over 16 years of

This tabulation is valuable in showing of school children which are found in the hearing and in nasal respiration as well teachers given some training in the met examinations and preparing their reports, greatest value in elevating the physical e capacity of the school children of New Yo the method has two marked defects besides teachers. It lacks first, the compulsion whi inspection law would give; second, it lack work which will enable the department to of the physical defects reported to the pare corrected.

In order to have these reports produce res ment find out what it is accomplishing, there *ment of examinations* formed. This depart head with proper clerical assistants at the cap be a sufficient number of inspectors and nu see that the work is properly done by each te latter to go to the homes and persuade parents corrected. With accurate accounts of such w the reports of the school examinations, definit accomplished of which the department would well as of the added skill of the teachers in ma

Respectfully submitted,
HERBERT D. SCHENCK, B.S., M.D.,

REPORT

OF THE

CONSULTING OPHTHALMOLOGIST

TABLE GIVING TOTALS AND PER CENT. OF DEFECTS.

Examination of School Children, 1912.

	Number examined	Distant Vision (20 Feet)		Focusing Power (Inches)		Eyes			Hearing		Ear		Nose. Frequent colds, catarrh	Throat. Mouth breather	Teeth	Cases reported to parents or guardians	Abnormal children	Backward	Wearing glasses
		Right eye	Left eye	Right eye	Left eye	Inflamed, discharging, squinting	Pain or fatigued after use	Headache, Daily, weekly	Right ear	Left ear	Frequent aches	Discharging, odor							
Total including those	......					......	......	......	*3.06*	*2 8*	*7 88*	*1.43*	*14.52*	*10.78*	*27.76*	*29.82*	*2.55*	*3.70*	*.05*
under 7 years	121,626	31,806	31,637	15,406	14,962	13,327	18,521	17,792	3,816	3,494	9,821	1,787	18,096	13,439	34,601	37,165	3,186	4,615	627
Total number over 7	......	*25 99*	*25.84*	*12.61*	*12 25*	*10 89*	*15.18*	*14 56*	*3.08*	*2 81*	*7 93*	*1.44*	*14.66*	*10.84*	*27.95*	*30.18*	*2.58*	*3.77*	*.51*
years	121,693	31,633	31,451	15,353	14,915	13,255	18,480	17,730	3,753	3,430	9,652	1,761	17,848	13,195	34,020	36,737	3,148	4,590	627
Under 7 years	......	*5 89*	*6.34*	*1.80*	*1 60*	*2.45*	*1.39*	*2.11*	*2.14*	*2.18*	*5 89*	*.88*	*8.45*	*8 31*	*19.91*	*14.59*	*1.29*	*.85*	......
	2,933	173	186	53	47	72	41	62	63	61	172	26	218	244	534	428	38	25	......
7–9 years	......	*27.50*	*27.60*	*12.95*	*12.66*	*8.90*	*9.92*	*9.54*	*2.86*	*2.58*	*8 88*	*1.41*	*12.53*	*10.86*	*28.30*	*29.73*	*2.63*	*2.04*	*.21*
	40,945	11,262	11,303	5,305	5,186	3,646	4,064	3,909	1,175	1,060	3,637	580	5,131	4,447	11,588	12,176	1,079	839	89
10–12 years	......	*25.40*	*24 97*	*13.15*	*12 68*	*12 07*	*17 85*	*16.49*	*3.16*	*2 87*	*8 78*	*1.56*	*15.06*	*11.49*	*29.05*	*31.64*	*2.87*	*4.34*	*.39*
	43,515	11,056	10,869	5,725	5,518	5,255	7,421	7,178	1,379	1,252	3,821	631	6,556	5,001	12,643	13,771	1,253	1,892	174
13–15 years	......	*25.02*	*24 93*	*12.07*	*11 78*	*11.95*	*18 82*	*18.12*	*3.38*	*3.07*	*6 35*	*1.40*	*16.05*	*10.44*	*27.62*	*30.30*	*2.25*	*5.34*	*.72*
	31,651	7,921	7,893	3,821	3,731	3,785	5,957	5,733	1,072	974	2,012	444	5,083	3,305	8,745	9,593	714	1,692	230
16 years	......	*24 97*	*24 82*	*8 99*	*8 59*	*10 19*	*18 59*	*16.21*	*2.27*	*2 57*	*3.20*	*1.00*	*19.31*	*7.91*	*18.70*	*21.44*	*1.82*	*2.99*	*2.40*
	5,582	1,394	1,386	502	480	569	1,038	905	127	144	179	56	1,078	442	1,044	1,197	102	167	134

receipt on file at the laboratory, and of
properly detailed report slips have been rece
addition slips incompletely reporting a us
without any means of identifying the user l
are filed for the amount of 742,500 units.

Reports of the use of diphtheria antito
450,000 units in 150 cases of disease othe
also filed at the laboratory.

There have been reported in sufficient det
2,535 cases of diphtheria. Of these, 2,345 re
a mortality of this class of cases for the yea
cent. For the treatment of these cases of
26,353,000 units of antitoxin were used; 2,
show the use of 18,779,700 units of antitoxin
units per case saved; 5,124 cases of use of
or immunization show the utilization of 7,5
toxin, an average of 1,500 units per case; 19
treated with a total of 2,216,500 units of an
have resulted fatally, and there is found h
dose used of 11,665 units of antitoxin for
cases. That such an amount of antitoxin u
enough to end fatally is absolutely unwarran
follow the insisted-upon directions of use of
been urgently pointed out in repeated report
would appear imperative to take some drastic
proper use of this antitoxin, and to hold seriou
physician who loses a case of diphtheria, tre
toxin, but not in compliance with the directio

There were 11 State institutions supplied wi
of diphtheria antitoxin in 1912, of which amo
are reported as used for purposes of immuniz
337,000 units of this antitoxin for 26 case
reported from these State institutions in 1912
of this disease in the State institutions in 1
reported, a male 21 years old, showing first s
receiving 1,500 units diphtheria antitoxing on J
following day (July 30) a further dose of 3,00
August 11 of " myocarditis."

REPORT

OF THE

ANTITOXIN LABORATORY

Commissioner, considerable quantities of thi
supplied to a party named by him, but no
this material has been furnished to the labo

The maintenance of the antitoxin laborator
tion has been declared a nuisance by the cit
number of the neighborhood associations, a
removal have been signed by several hundr
of the locality, etc., and duly presented to t
Health, in a persistent effort to bring about
work from its present location.

Respectfully submi
WILLIAM S
Directo

REPORT OF THE ANTITOXIN LABORATORY

Eugene H. Porter, A.M., M.D., Dr.P.H., *State Commissioner of Health, Albany, N. Y.:*

Sir:— I have the honor to submit to you the report of the work of the Antitoxin Laboratory for the year 1912, following the order of the statement of the preceding years for purposes of comparison.

The total amount of diphtheria antitoxin supplied during 1912 is represented by 40,745 packages of equivalent of 1,500 units of antitoxic value; tabulated in towns, villages, and cities supplied, and by years since 1902:

YEAR	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Cities	20	42	42	42	42	42	43	47	53	44	45
Villages	161	204	617	691	793	828	926	169	168	236	192
Towns	171	280						273	232	206	226
Totals	362	526	659	733	835	870	969	489	453	486	436

A study of this table is quite sufficient to show that a distribution of antitoxin which is left to the local health officer's judgment for requisition of supplies is not adequate to assure the sufficient available supply of this antitoxin throughout the State. Repeating the substance of previous reports on the matter, whereas the number of towns, villages and cities in the State is 1,427, 941 of these failed to make any provision of this antitoxin in 1911, and 964 of these failed to make any provision in 1912.

A total of 61,117,500 units of diphtheria antitoxin was distributed for use in the State in the year 1912.

Proper requisition form is filed at the laboratory for 57,703,500 units, leaving an amount of 3,414,000 units distributed for which a proper requisition is not on file.

Of the total amount of this antitoxin distributed, a trifle more than half — 30,949,000 units have been duly accounted for by

Laboratory Diagnostic Work

MONTH	Cultures for Diphtheria								
	Positive					Negative			
	1908	1909	1910	1911	1912	1908	1909	1910	1911
January	50	120	284	124	69	61	150	282	309
February	87	83	253	123	58	82	54	389	414
March	84	30	231	90	117	68	40	331	365
April	60	59	478	86	74	44	35	439	393
May	58	32	171	122	47	23	52	581	479
June	32	54	100	125	75	35	69	326	275
July	31	49	61	133	33	45	55	394	331
August	32	26	88	68	79	27	81	472	271
September	61	34	77	77	99	53	68	541	190
October	52	24	107	196	235	45	68	266	591
November	85	101	124	174	232	129	169	222	533
December	109	143	148	443	204	123	173	337	1,422
Total	741	755	1,822	1,761	1,322	735	1,024	4,580	5,573

Laboratory Diagnostic Work for 1912 –

MONTH	Sputum Examinations									
	Positive					Negative				
	1908	1909	1910	1911	1912	1908	1909	1910	1911	1912
January	14	51	48	52	55	40	92	94	164	15[illegible]
February	23	44	43	62	60	40	101	110	169	151
March	29	58	76	56	71	40	85	150	181	189
April	28	44	61	54	55	47	69	162	180	216
May	33	45	53	76	71	42	120	121	160	210
June	35	39	38	67	62	45	115	89	164	203
July	31	33	36	52	82	37	135	79	102	180
August	28	60	56	51	65	42	113	80	120	122
September	31	32	37	43	56	61	110	71	123	122
October	55	39	48	51	50	27	115	98	109	141
November	7	36	42	49	46	9	89	99	126	149
December	15	45	46	45	50	68	101	124	157	126
Total	339	526	584	658	723	498	1,245	1,277	1,755	1,966

REPORT

OF THE

HYGIENIC LABORATORY

Report of the Work of the New York State Hygienic Laboratory for the Year 1912

1909	1910	1911	1912	NUMBER OF PACKAGES OF							Increase of 1910 over 1909	Increase of 1911 over 1910	Increase of 1912 over 1911
											Per cent	*Per cent*	*Per cent*
23,588	36,916	43,709	40,745	Diphtheria antitoxin distributed (1,500 units)							56+	18.4	—7
4,313	9,655	8,095	8,508	Tetanus antitoxin distributed (1,500 units)							124—	16.0	+5
22,000	24,454	22,366	35,000	Outfits — prophylaxis ophthalmia							11—	8.5	+50
....	3,289	3,374	4,109	Outfits — sputum specimens							+	2.6	+21
....	1,834	1,868	1,690	Outfits — Widal test							+	1.9	+10
....	9,152	15,579	15,000	Outfits — diphtheria culture							+	70.0	—
3,695	8,914	39,529	11,550	Specimens examined for diagnosis							141+	343.5	+10
....	......	......	1,400	Doses typhoid vaccine							....	....	....
....	......	......	100	Treatments rabies							....	....	....
....	......	......	26	Complete mineral water analyses							....	....	....
....	......	......	932	Mineralization tests on 31 springs							....	....	....
					Positive			Negative					
					1910	1911	1912	1910	1911	1912			
1,971	6,421	7,334	5,620	Diphtheria cultures	1,826	1,721	1,322	4,595	5,573	4,298	225+	14.21	+ 8.3
1,766	1,861	2,413	2,689	Sputum specimens	584	658	723	1,277	1,755	1,966	5+	20.0	+ 5
358	632	729	849	Widal test (blood serum)	254	288	297	378	441	552	76+	15.44	+ 6
....	......	29,053	......	Cholera cultures	......	26	......	......	26,994	...			
2,013	2,662	3,981	5,200	[illegible]									

REPORT OF THE HYGIENIC LABORATORY

EUGENE H. PORTER, A.M., M.D., Dr.P.H., *State Commissioner of Health, Albany, N. Y.:*

SIR:— I have the honor to submit to you the report of the work of the Hygienic Laboratory of this Department for the year of 1912, in tabulated form for purposes of comparison with the work of other years and for reference for such data as required in future.

Referring to the portions of your own report of this year, pages 3, 4, 6, 9, 39, 42–46, 56–59 summarize much of the activities of this laboratory, and such are not repeated here.

The entire work of mineralogical analyses of the springs waters at Saratoga has been carried on by the laboratory for the State Reservation Commission completely absorbing the effort and time of one-third of the entire chemical staff of the laboratory. During the year 26 complete mineralogical water analyses have been made and reported to that State Reservation Commission, as well as 932 control mineralogical test examinations of 31 of these springs to measure the variance of their mineralization. Usual sanitary analyses, bacteriological and chemical, of the waters of such springs as are opened to the public are made at intervals and also reported to the above Commission.

Respectfully submitted,

WILLIAM S. MAGILL,

Director of Laboratories

Analytical Results of Samples of Water — (*Continued*)

City, Town or Village	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per cc..	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Albany	Purified water delivered to city	4/ 8/12	15	Trace	102	86	.010	.088	Trace	0.34	1.62	51.4	45.0	3.40	14	—	—	—	..
Albany	Raw Hudson river water	5/ 2/12	35	20	100	73	.026	.108	.004	0.16	1.50	64.3	41.0	5.60	2,500	..	..	+	+
Albany	Prefiltered effluent applied to slow sand filters	5/ 2/12	....	....	....	....	....	....	....	....	....	....	....	....	700	+	+	+	..
Albany	Purified water	5/ 2/12	15	Clear	88	66	.006	.064	Trace	0.26	1.75	65.7	38.5	3.60	17	—	—	—	..
Albany	Raw Hudson river water	6/ 7/12	27	17	80	56	.018	.120	.007	0.20	3.00	61.4	60.0	7.70	4,000	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	6/ 7/12	....	....	....	....	....	....	....	....	....	....	....	....	180	....	+	+	—
Albany	Purified water delivered to city	6/ 7/12	15	Trace	88	67	.003	.046	.001	0.36	3.00	55.7	54.0	4.70	33	—	—	—	..
Albany	Raw Hudson river water	7/10/12	55	10	176	135	.050	.142	.003	0.08	5.50	72.9	69.0	24.40	2,600	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	7/10/12	....	....	....	....	....	....	....	....	....	....	....	....	1,300	+	+	+	..
Albany	Purified water delivered to city	7/10/12	38	Clear	169	139	.024	.070	.001	0.08	6.00	75.7	66.0	20.00	60	+	+	+	..
Albany	Raw Hudson river water	9/ 3/12	35	80	190	168	.028	.126	.004	0.08	6.25	62.9	59.0	25.60	2,000	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	9/ 3/12	....	....	....	....	....	....	....	....	....	....	....	....	600	....	+	+	+
Albany	Purified water delivered to city	9/ 3/12	30	Clear	212	192	.006	.068	.001	0.04	6.75	70.0	63.0	22.00	33	+	—	—	..
Albany	Effluent filter unit No. 4	9/ 3/12	....	....	....	....	....	....	....	....	....	....	....	....	23	+	+	—	..
Albany	Raw Hudson river water	10/ 9/12	35	30	151	105	.008	.126	.005	0.18	3.25	68.6	64.0	11.90	6,000	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters																		
Albany	Purified water delivered to city	10/ 9/12	....	....	....	....	....												
Albany	Raw Hudson [illegible]	10/ 9/12	30	Trace	[illegible]	[illegible]													

Laboratory Diagnostic Work for 1912 —(Concluded)

MONTH	WIDAL TEST FOR TYPHOID FEVER														
	POSITIVE					NEGATIVE					TOTAL				
	1908	1909	1910	1911	1912	1903	1909	1910	1911	1912	1903	1909	1910	1911	1912
January	4	12	17	9	17	8	15	26	32	23	18	34	43	41	40
February	7	25	28	7	17	14	24	21	18	27	24	77	49	25	44
March	5	18	21	12	29	13	18	21	31	57	24	63	42	43	86
April	....	10	6	7	19	6	9	22	30	30	7	30	28	37	49
May	8	....	8	10	20	11	15	13	32	43	21	17	21	42	63
June	6	2	9	9	13	16	12	15	36	38	25	14	34	45	51
July	11	1	32	17	15	15	10	46	44	57	35	11	78	61	72
August	29	1	23	38	35	33	8	41	58	77	81	9	61	96	112
September	19	3	26	62	49	61	18	46	40	49	83	22	72	102	98
October	16	....	29	46	49	41	18	38	35	57	63	18	67	81	106
November	26	5	38	33	14	48	16	62	44	47	76	21	100	77	61
December	16	15	17	38	20	16	16	27	41	47	31	30	44	60	67
Total	147	92	251	288	297	232	179	378	441	552	490	353	632	720	849

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present (−=Absent)) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Amenia	Tap, public supply	8/30/12	Trace	Clear	44	33	.002	.004	Trace	0.02	1.25	19.5	19.0	0.60	500	+	+	−	..
Amenia	Tap, public supply	10/18/12	Trace	Clear	264	213	.002	.012	Trace	1.00	6.50	208.0	206.0	0.70	40	−	−	−	..
Amenia	Tap, public supply	12/21/12	5	Clear	44	36	.012	.024	.001	0.02	1.25	19.5	13.0	1.70	400	+	−	−	..
Amsterdam	Tap, public supply	2/ 2/12	52	Trace	47	28	.018	.060	Trace	0.26	2.25	20.8	11.0	9.60	325	+	+	−	..
Amsterdam	Tap, public supply	3/15/12	35	Clear	51	23	.040	.102	.001	0.36	1.00	22.1	11.0	7.40	2,000	+	−	−	..
Amsterdam	Tap, public supply	4/ 6/12	25	15	50	36	.040	.118	.002	0.24	1.00	23.4	12.0	6.40	15,000	+	+	+	..
Amsterdam	Tap, public supply	6/21/12	60	8	38	27	.010	.128	.001	0.04	0.75	18.2	9.0	8.30	180	+	+	−	..
Amsterdam	Tap, public supply	11/ 1/12	75	20	70	34	.026	.214	Trace	0.10	1.00	32.5	13.0	15.20	3,100	+	+	−	..
Amsterdam	Tap, public supply	12/12/12	65	3	56	26	.018	.128	Trace	0.14	1.50	23.4	8.0	11.20	180	+	−	−	..
Andover	Tap, public supply	1/20/12	15	10	70	50	.070	.134	.002	0.80	3.50	23.4	14.0	3.50	5,600	+	+	+	..
Andover	Tap, public supply	2/22/12	Trace	Clear	47	36	.012	.032	Trace	1.08	1.50	22.1	21.0	1.00	1,600	+	+	−	..
Andover	Tap, public supply	4/13/12	5	Clear	46	29	.002	.028	Trace	0.80	1.25	19.5	17.0	0.40	50	+	−	−	..
Andover	Tap, public supply	10/ 5/12	Trace	Clear	45	25	.004	.016	.001	0.80	1.50	22.1	18.0	0.60	30	+	−	−	..
Andover	Tap, public supply	11/22/12	1	Trace	50	42	.014	.056	Trace	1.20	0.75	39.0	18.0	0.60	90	+	−	−	..
Angelica	Tap, public supply	1/20/12	Trace	Clear	106	84	.014	.008	.001	0.60	1.37	64.3	53.0	0.20	325	+	−	−	..
Angelica	Tap, public supply	2/20/12	Trace	Clear	75	65	.010	.018	Trace	0.60	1.25	57.1	47.0	0.50	4,000	+	−	−	..
Angelica	Tap, public supply	4/12/12	Trace	Clear	93	78	.002	.012	.001	0.50	1.75	57.1	53.0	Trace	110	−	−	−	..
Angelica	Tap, public supply	10/ 5/12	5	Trace	85	78	.004	.018	.003	0.40	2.00	67.1	56.0	1.90	250	+	−	−	..
Angelica	Tap, public supply	11/22/12	Trace	Clear	90	81	.010	.042	Trace	0.60	2.00	55.7	53.0	0.70	10	−	−	−	..
Angola	Tap, public supply	8/28/12	Trace	8	176	145	.012	.050	.001	Trace	7.75	120.0	105.0	1.10	......				..
Angola	Tap, public supply	9/10/12	......	......	......	......	......	......	......	......					......	....	....	....	..
Antwerp	Tap, public supply	1/ 9/12	65	Trace	[illegible]	[illegible]	[illegible]								[illegible]				

Table of Analytical Results of Samples of Water Obtained from Public Supplies or Supplies Used by Public Institutions

RESULTS IN PARTS PER MILLION

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as— Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+ Present) (— Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Adams	Tap, public supply	1/11/12	Trace	Clear	175	156	.006	.004	Trace	0.80	1.62	131.4	128.0	0.10	60	—	—	—	..
Adams	Tap, public supply	3/1/12	Trace	Clear	190	176	.008	.010	Trace	1.20	1.50	122.8	123.0	0.60	20	—	—	—	..
Adams	Tap, public supply	4/25/12	Trace	Clear	174	163	.002	.020	.001	0.80	1.25	134.2	133.0	1.00	180	—	—	—	..
Adams	Tap, public supply	10/30/12	5	3	187	178	.006	.048	Trace	0.72	1.25	145.8	128.0	0.60	425	+	—	—	..
Adams	Tap, public supply	11/30/12	Trace	Clear	167	145	.006	.014	Trace	0.80	1.00	134.2	131.0	0.70	140	+	+	—	..
Addison	Tap, public supply	1/6/12	10	5	128	101	.048	.070	.004	0.80	5.75	87.1	82.0	1.10	7,300	+	+	—	..
Addison	Tap, public supply	11/26/12	Trace	Clear	53	42	.008	.076	Trace	0.34	1.25	31.2	24.0	2.10	30	+	—	—	..
Afton	Tap, public supply	2/1/12	Trace	Clear	52	46	.020	.016	Trace	0.60	0.87	44.3	41.0	0.50	10	—	—	—	..
Afton	Tap, public supply	4/13/12	Trace	Clear	60	46	.002	.002	.001	0.40	1.00	42.9	40.0	Trace	20	—	—	—	..
Afton	Tap, public supply	9/12/12	Trace	Clear	106	86	.002	.004	Trace	0.44	0.75	42.9	41.0	0.40	30	—	—	—	..
Afton	Tap, public supply	10/25/12	Trace	Clear	74	59	.004	.028	Trace	0.60	0.75	42.9	40.0	0.20	120	—	—	—	..
Afton	Tap, public supply	12/6/12	Trace	Clear	58	53	.008	.004	Trace	0.60	1.12	48.6	41.0	0.50	10	—	—	—	..
Akron	Tap, public supply	3/4/12	Trace	Clear	1,665	1,475	.008	.050	Trace	0.90	18.25	1365.0	232.0	0.20	550	+	—	—	..
Akron	Tap, public supply	11/25/12	Trace	Clear	1,509	1,405	.006	.038	.001	2.40	17.25	1015.0	246.0	0.20	40	—	—	—	..
Albany	Raw Hudson river water	1/15/12	20	5	171	145	.130	.130	.004	0.24	4.25	81.4	70.0	11.00	1,200	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	1/15/12	....	....	....	....	....	....	....	....	....	....	....	....	375	....	+	+	—
Albany	Purified water delivered to city	1/15/12	15	Clear	147	118	.066	.064	.001	0.18	4.75	80.0	75.0	7.80	33	+	—	—	..
Albany	Raw Hudson river water	2/9/12	15	5	145	80	.178	.148	.003	0.26	4.75	74.3	71.0	12.60	5,600	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	2/9/12	....	....	....	....	....	....	....	....	....	....	....	....	3,100	....	+	+	—
Albany	Purified water delivered to city	2/9/12	15	Clear	149	101	.062	.052	.001	0.36	5.00	75.7	70.0	11.00	325	+	—	—	..
Albany	Raw Hudson river water	3/11/12	40	5	150	128	.144	.156	.003	0.32	4.75	100.0	75.0	12.00	6,000	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	3/11/12	....	....	....	....	....	....	....	....	....	....	....	....	2,600	....	+	+	+
Albany	Purified water delivered to city	3/11/12	20	Clear	154	109	.151	.078	Trace	0.32	5.25	100.0	73.0	9.40	21	—	—	—	..
Albany	Raw Hudson river water	4/8/12	22	225	119	97	.032	.192	.001	0.34	1.50	51.4	45.0	9.00	12,900	....	....	+	+
Albany	Prefiltered effluent applied to slow sand filters	4/8/12	....	....	....	....	....	....	....	....	....	....	....	....	5,900	....	+	+	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Ballston Spa	Tap, public supply	7/23/12	7	5	50	32	.010	.050	.001	0.06	0.25	27.3	26.0	1.20	850	+	+	—	..
Ballston Spa	Tap, public supply	9/20/12	10	Clear	44	30	.004	.026	.001	0.08	0.37	26.0	20.0	1.20	85	+	—	—	..
Ballston Spa	Tap, public supply	11/ 4/12	5	Clear	47	38	.012	.076	.001	0.02	0.50	29.9	24.0	1.50	80	—	—	—	..
Batavia	Tap, public supply	1/16/12	10	15	232	204	.042	.038	.001	0.60	4.62	160.0	152.0	1.10	550	+	+	+	..
Batavia	Tap, public supply	3/ 4/12	10	18	179	157	.020	.102	.001	0.70	3.50	105.8	100.0	2.60	9,000	+	+	+	..
Batavia	Tap, New York State School for the Blind	3/ 5/12	Trace	Clear	313	285	.006	.016	Trace	1.50	5.25	243.0	228.0	0.10	50	—	—	—	..
Batavia	Tap, New York State School for the Blind	3/26/12	Trace	Clear	295	264	.004	.026	Trace	0.48	4.25	250.0	208.0	0.10	2,100	—	—	—	..
Batavia	Tap, New York State School for the Blind	5/ 1/12	Trace	Clear	371	319	.004	.028	Trace	0.04	4.37	278.5	268.0	0.20	30	—	—	—	..
Batavia	Tap, New York State School for the Blind	5/28/12	Trace	Clear	434	393	.002	.020	Trace	0.08	5.50	364.5	325.0	0.20	80	—	—	—	..
Batavia	Tap, public supply	6/25/12	Trace	Clear	680	647	.004	.004	.001	0.16	3.75	285.5	273.0	0.20	60	—	—	—	..
Batavia	Tap, public supply	9/27/12	10	5	255	230	.012	.082	.002	0.08	10.00	188.5	160.0	3.00	10,500	+	+	+	..
Batavia	Tap, public supply	10/15/12	Trace	Clear	378	338	.004	.028	.001	2.16	6.75	285.5	246.0	0.70	90	+	—	—	..
Batavia	Tap, public supply	11/ 2/12	Trace	Clear	413	353	.004	.036	Trace	2.40	7.00	335.5	254.0	0.40	40	—	—	—	..
Batavia	Tap, New York State School for the Bl[illegible]	11/22/12	8	18	214	190	.014	.088	.001	0.10	4.25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Bath	Tap at Hodge's store, near Soldiers and Sailors' Home, public supply	5/23/12	Trace	Clear	280	241	.006	.008	Trace	1.30	4.75	177.2	168.0	0.30	55	—	—	—
Bath	Tap at power house, Soldiers and Sailors' Home	6/27/12	Trace	Clear	194	163	.018	.004	.001	0.02	6.25	148.6	147.0	0.20	1,500	+	+	—
Bath	Tap at Hodge's store, near Soldiers and Sailors' Home, public supply	6/27/12	Trace	Clear	275	242	.002	.002	.001	1.44	5.00	171.4	171.0	0.20	17,500	+	—	—
Bath	Tap at power house, Soldiers and Sailors' Home	8/ 3/12	Trace	Clear	198	177	.024	.002	Trace	Trace	5.50	134.2	......	0.10	40	+	—	—
Bath	Tap at Hodge's store, near Soldiers and Sailors' Home, public supply	8/ 3/12	Trace	Clear	242	202	.004	.004	Trace	1.20	4.75	177.2	176.0	0.10	75	—	—	—
Bath	Tap, public supply	10/ 5/12	Trace	Clear	236	214	.008	.012	.001	0.60	3.75	208.0	181.0	0.70	20	—	—	—
Bath	Tap, 57 Belfast street, public supply	10/19/12	Trace	Clear	252	211	.004	.042	Trace	1.00	4.00	194.2	174.0	0.60	2,500	—	—	—
Bath	Tap, Soldiers and Sailors' Home	10/19/12	Trace	Clear	190	168	.004	.018	Trace	0.02	5.00	151.4	141.0	0.20	2,750	—	—	—
Bath	Tap, Soldiers and Sailors' Home	11/18/12	Trace	Clear	185	163	.032	.020	Trace	Trace	5.00	151.4	151.0	0.30	100	—	—	—
Bath	Tap, 57 Belfast street, public supply	11/18/12	Trace	Clear	228	191	.010	.042	Trace	0.90	4.25	180.0	175.0	0.80	30	—	—	—
Bath	Tap, public supply	11/25/12	Trace	Clear	229	194	.004	.014	Trace	0.92	4.25	174.2	172.0	0.10	200	+	—	—
Bedford Hills	Tap, New York State Reformatory for Women	2/24/12	5	Clear	103	87	.016	.092	.001	0.44	5.00	58.6	50.0	2.30	18,500	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	3/27/12	Trace	Clear	108	77	.008	.028	Trace	0.36	6.00	70.0	53.0	0.10	100	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	4/23/12	Trace	Clear	98	87	.008	.030	.001	0.04	5.50	60.0	55.0	0.30	40	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	6/ 3/12	Trace	Trace	135	102	.008	.014	.001	0.40	7.00	68.6	59.0	0.20	2,400	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	7/ 3/12	Trace	Clear	145	106	.002	.002	.001	0.48	6.25	70.0	64.0	0.10	5,000	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	8/ 3/12	Trace	Clear	115	105	.002	.002	Trace	0.48	6.00	71.4	66.0	0.10	7,500	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	10/17/12	Trace	Clear	118	104	.004	.014	Trace	0.80	5.75	77.1	69.0	1.00	600	—	—	—
Bedford Hills	Tap, New York State Reformatory for Women	11/27/12	Trace	Clear	121	107	.008	.040	Trace	0.50	7.50	74.3	68.0	0.50	3,600	—	—	—
Belfast	Tap, public supply	4/15/12	Trace	Clear	280	265	.004	.034	Trace	0.14	10.75	168.6	97.0	0.20	1,100	—	—	—
Belfast	Tap, public supply	9/26/12	Trace	Clear	301	275	.002	.002	Trace	0.24	16.50	228.5	......	0.60	600	+	—	—
Belfast	Tap, public supply	11/22/12	Trace	Trace	298	278	.020	.038	Trace	0.20	16.00	214.5	226.0	0.70	180	—	—	—
Belmont	Tap, public supply	1/20/12	14	10	109	79	.134	.170	.002	0.30	2.00	51.4	50.0	5.78	9,600	+	+	+
Belmont	Tap, public supply	2/24/12	25	8	94	74	.088	.124	.001	0.48	2.62	48.6	43.0	5.00	19,000	+	+	+
Belmont	Tap, public supply	4/13/12	15	15	63	42	.016	.010	.001	0.40	1.25	26.0	16.0	3.30	200	+	—	—
Belmont	Dam	4/20/12	......	......	......	......	......	......	......	......	......	......	......	......	600	+	+	+
Belmont	Reservoir	4/20/12	......	......	......	......	......	......	......	......	......	......	......	......	200	—	—	—
Belmont	Tap, public supply	10/ 5/12	20	5	70	53	.014	.106	Trace	0.10	0.75	41.6	35.0	2.50	9,200	+	+	—
Belmont	Tap, public supply	11/22/12	15	Trace	64	53	.016	.092	Trace	0.14	1.00	42.9	35.0	2.70	230	+	—	—
Bergen	Tap, public supply	3/ 4/12	Trace	Clear	1,140	1,045	.010	.024	.001	1.44	6.25	335.5	252.0	1.00	3,400	+	—	—
Bergen	Tap, public supply	9/27/12	......	......	......	......	......	......	......	......	......	......	......	......	30	+	—	—
Bergen	Tap, public supply	11/23/12	Trace	Clear	1,363	1,248	.078	.022	.200	0.90	4.50	829.0	285.0	1.00	400	—	—	—
Bethany	Little Tonawanda creek, 50 feet below highway bridge	7/ 1/12	7	3	220	170	.038	.088	.004	0.60	2.75	151.4	149.0	2.90	......	......	......	......

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per cc..	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Bethany	Little Tonawanda creek, one-half mile above Dale	7/ 1/12	18	5	224	204	.024	.052	.002	0.48	2.00	160.0	168.0	2.30	....	....	....	....	..
Bethany	Little Tonawanda creek 2½ miles above Linden	7/ 1/12	10	5	201	178	.034	.032	.007	1.20	3.25	157.2	146.0	1.20	....	....	....	....	..
Binghamton	Raw water	2/ 9/12	5	Trace	118	93	.030	.058	.001	0.90	5.00	75.7	69.0	1.10	3,000	+	+	+	..
Binghamton	Filtered water	2/ 9/12	Trace	Clear	112	102	.036	.018	.001	0.80	5.12	75.7	63.0	0.60	35	+	—	—	..
Binghamton	Raw water	3/18/12	10	150	77	47	.054	.370	.002	0.08	2.50	28.6	21.0	14.60	15,000	+	+	+	..
Binghamton	Filtered water	3/18/12	10	Trace	61	41	.058	.032	.001	0.40	2.50	28.6	10.0	0.90	1,700	+	—	—	..
Binghamton	Tap, State hospital	5/ 8/12	Trace	Trace	165	115	.004	.036	.001	0.60	14.75	67.1	55.0	0.90	20	—	—	—	..
Binghamton	Raw water, public supply	4/29/12	22	5	93	80	.016	.084	.001	0.72	5.00	62.9	49.0	1.70	2,000	+	+	—	..
Binghamton	Filtered water, public supply	4/29/12	Trace	Clear	96	75	.014	.054	Trace	0.60	5.00	64.3	43.0	0.50	10	+	—	—	..
Binghamton	Tap, public supply	9/12/12	Trace	Clear	118	97	.002	.032	Trace	0.40	6.62	57.1	45.0	1.30	50	+	—	—	..
Binghamton	Tap, public supply	10/31/12	5	Trace	114	85	.008	.128	.001	0.80	5.50	60.0	42.0	1.50	400	+	—	—	..
Binghamton	Tap, public supply	11/29/12	5	Trace	104	82	.014	.050	Trace	0.72	4.75	55.7	42.0	1.30	30	—	—	—	..
Binghamton	Tap, public supply	12/31/12	Trace	Clear	110	94	.026	.052	.001	0.90	6.00	64.3	42.0	0.60	1,400	—	—	—	..
Bliss	Tap, public supply	4/ 1/12	Trace	Clear	170	143	.008	.016	.001	1.30	2.00	140.0	130.0	0.50	2,600	+	+	—	..
Bliss	Tap, public supply	11/21/12	Trace	Clear	179	161	.010	.018	.001	1.08	1.25	140.0	130.0	0.20	20	—	—	—	..
Bloomville	Tap, public supply	3/10/12	5	Clear	42	13	.021	.052	Trace	0.52	0.62	12.7	11.0	0.30	1,300	+	—	—	..
Bolivar	Tap, public supply	1/22/12	5	3	142	111	.016	.020	Trace	0.16	5.50	100.0	53.0	0.10	100	[illegible]	[illegible]	[illegible]	[illegible]
Bolivar	Tap, public supply	2/24/12	Trace	Clear	129	112	.020	.028	Trace	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Bolivar	[illegible]	4/12/12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Brewster	Tap, Avery supply	2/28/12	Trace	Clear	192	156	.012	.032	.001	2.40	15.00	77.1	55.0	0.20	40	—	—
Brewster	Tap, municipal supply	3/29/12	Trace	Clear	71	54	.010	.002	Trace	1.08	3.75	32.5	18.0	0.30	30	—	—
Brewster	Tap, Avery supply	3/29/12	5	Trace	178	153	.006	.001	Trace	1.70	14.00	85.7	50.0	0.20	200	—	—
Brewster	Tap, municipal supply	5/ 3/12	Trace	Clear	78	63	.008	.014	Trace	0.40	2.75	23.4	18.0	0.10	25	—	—
Brewster	Tap, Avery supply	5/ 3/12	Trace	Clear	186	153	.004	.024	Trace	1.60	14.75	70.0	49.0	0.40	30	—	—
Brewster	Tap, municipal supply	8/30/12	Trace	Clear	117	95	.004	.006	Trace	0.30	3.50	54.3	53.0	0.30	180	+	+
Brewster	Tap, Avery supply	8/30/12	Trace	Clear	215	191	.002	.006	Trace	1.40	16.50	84.3	67.0	0.10	50	—	—
Brewster	Tap, municipal supply	10/18/12	5	Trace	116	97	.004	.050	Trace	0.60	4.75	64.3	59.0	1.00	2,200	+	+
Brewster	Tap, Avery supply	10/18/12	Trace	Clear	239	189	.004	.056	Trace	1.60	18.25	100.0	78.0	0.60	100	—	—
Brewster	Tap, municipal supply	12/19/12	Trace	Clear	110	87	.014	.036	Trace	1.00	4.50	42.9	33.0	0.70	10	—	—
Brewster	Tap, Avery supply	12/19/12	Trace	Clear	227	209	.018	.028	Trace	2.00	17.2	94.3	65.0	1.40	10	—	—
Briarcliff Manor	Tap, public supply	2/22/12	15	5	127	117	.012	.048	.001	0.60	4.50	50.0	36.0	2.90	1,200	+	—
Briarcliff Manor	Tap, public supply	3/27/12	Trace	Clear	271	228	.004	.012	Trace	1.20	6.50	122.8	85.0	0.10	1,800	—	—
Briarcliff Manor	Well No. 1, public supply	4/9 /12													15	—	—
Briarcliff Manor	Well No. 2, public supply	4/ 9/12													20	—	—
Briarcliff Manor	Well No. 3, public supply	4/ 9/12													45	+	+
Briarcliff Manor	Well No. 4, public supply	4/ 9/12													10	—	—
Briarcliff Manor	Well No. 5, public supply	4/ 9/12													30	—	—
Briarcliff Manor	Well No. 6, public supply	4/ 9/12													50	—	—
Briarcliff Manor	Tap, public supply	4/ 9/12													60	+	—
Briarcliff Manor	Tap, public supply	8/28/12													10	—	—
Briarcliff Manor	Tap, public supply	12/19/12	Trace	Clear	274	248	.024	.030	Trace	0.40	6.75	120.0	82.0	0.80	30	+	—
Brockport	Tap, public supply	1/15/12	22	Clear	448	398	.022	.114	.004	1.80	12.50	335.5	224.0	5.00	450	+	—
Brockport	Tap, public supply	1/29/12	20	Clear	388	331	.036	.104	.003	1.60	9.25	250.0	192.0	3.60	1,800	+	—
Brockport	Tap, public supply	3/ 4/12	20	Clear	308	220	.008	.086	.001	1.44	8.00	185.8	175.0	3.50	1,700	+	—
Brockport	Tap, public supply	4/22/12	5	Clear	295	251	.002	.048	Trace	0.90	4.75	208.0	170.0	1.10	1,100	—	—
Brockport	Tap, public supply	9/18/12	8	15	330	303	.002	.056	.001	1.00	6.00	235.5	197.0	2.00	40,500	+	+
Brockport	Tap, public supply	11/21/12													180	+	—
Brocton	Tap, public supply	3/ 8/12	20	Trace	96	76	.020	.069	.001	0.34	2.00	54.3	51.0	2.50	525	+	—
Brocton	Tap, public supply	4/16/12	10	10	51	41	.012	.028	.001	0.24	1.50	39.0	30.[illegible]	1.80	2,200	+	—
Brocton	Tap, public supply	9/21/12	20	5	152	135	.010	.078	.001	0.10	2.00	120.0	100.0	5.20	55,000	+	+
Brocton	Tap, public supply	11/ 9/12	20	5	140	115	.016	.092	Trace	0.06	1.75	97.2	88.0	4.50	6,700	+	—
Brocton	Tap, public supply	12/12/12	25	15	115	97	.012	.074	Trace	0.16	1.75	62.9	59.0	3.00	1,600	+	—
Bronxville	Tap, public supply	1/18/12	25	2	95	68	.038	.170	.004	0.90	7.25	40.3	33.0	3.20	27,000	—	—
Bronxville	Tap, public supply	2/22/12	11	5	114	73	.088	.134	.005	1.36	8.00	57.1	29.0	3.80	170	—	—
Bronxville	Tap, public supply	3/27/12	10	10	80	57	.066	.130	.004	0.80	5.50	35.1	20.0	2.00	200	—	—
Bronxville	Tap, public supply	5/ 4/12													1,300	—	—
Bronxville	Tap, public supply	8/29/12	5	Clear	130	95	.002	.106	Trace	0.24	6.50	68.6	67.0	2.10	100	+	—
Bronxville	Tap, public supply	10/16/12	30	15	120	101	.008	.156	.001	0.34	6.00	80.0	64.0	2.30	550	—	—
Bronxville	Tap, public supply	12/16/12	20	Trace	103	82	.016	.134	.001	0.12	6.75	57.1	45.0	3.80	210,000	+	—
Brooklyn	Tap, laboratory, State Hospital, Long Island	5/13/12	Trace	Clear	279	238	.002	.008	Trace	6.40	20.00	131.4	86.0	0.10			
Brooklyn	Tap, drug room, State Hospital, Long Island	5/13/12													16,000	—	—
Brooklyn	Tap, main kitchen, State Hospital, Long Island	5/13/12													6,900	—	—
Buffalo	Tap, State Hospital	5/ 8/12	5	5	165	130	.004	.064	.001	0.06	7.25	94.2	90.0	1.50	2,800	—	—
Burke	Tap, public supply	1/ 6/12	5	5	101	79	.016	.018	Trace	2.00	1.25	64.3	63.0	0.90	90	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	B. Coli Type 1 c.c.	B. Coli Type 1-10 c.c.	B. Coli Type 1-100 c.c.
rke	Tap, public supply	3/14/12	5	Clear	91	75	.016	.022	Trace	2.40	0.75	71.4	64.0	0.60	150	+	—	—	..
rke	Tap, public supply	4/18/12	5	Clear	104	85	.004	.052	.001	1.80	0.75	55.7	51.0	1.40	850	+	—	—	..
rke	Tap, public supply	9/ 7/12	1	1	115	95	.002	.016	Trace	1.60	1.00	58.6	53.0	0.80	575	+	—	—	..
rke	Tap, public supply	10/25/12	Trace	Clear	132	102	.004	.026	.001	2.20	1.00	65.7	57.0	0.80	450	+	—	—	..
rke	Tap, public supply	12/ 5/12	Trace	Clear	92	66	.008	.054	Trace	3.00	0.87	52.9	48.0	2.30	40	+	—	—	..
ledonia	Tap, public supply	4/ 2/12	Trace	Clear	1,154	1,016	.004	.016	Trace	2.40	82.00	657.0	191.0	0.50	1,300	—	—	—	..
mbridge	Tap, public supply	1/30/12	Trace	Clear	70	52	.036	.040	Trace	0.50	1.00	50.0	40.0	0.90	70	+	—	—	..
mbridge	Tap, public supply	3/12/12	Trace	Clear	60	52	.010	.046	Trace	0.52	1.00	40.3	33.0	1.50	2,700	+	—	—	..
mbridge	Tap, public supply	4/18/12	5	Clear	108	88	.006	.016	.001	0.34	1.00	57.1	48.0	0.20	20	—	—	—	..
mbridge	Tap, public supply	9/17/12	Trace	Clear	150	129	.004	.002	.001	0.68	1.75	94.3	84.0	0.50	120	+	—	—	..
mbridge	Tap, public supply	11/12/12	10	Clear	83	63	.014	.058	.001	0.34	0.37	60.0	52.0	1.50	70	+	—	—	..
mbridge	Tap, public supply	12/27/12	Trace	Clear	78	70	.014	.060	Trace	0.44	1.00	57.1	55.0	1.00	80	—	—	—	..
mden	Tap, public supply	2/19/12	3	Clear	70	60	.020	.042	Trace	0.52	0.62	60.0	51.0	1.64	50	+	—	—	..
mden	Tap, public supply	5/ 1/12	15	5	69	55	.004	.038	Trace	0.36	3.00	51.4	45.0	3.70	650	+	—	—	..
mden	Tap, public supply	8/ 1/12	7	Clear	100	80	.002	.018	Trace	0.48	0.50	60.0	58.0	0.90	620	—	—	—	..
mden	Tap, public supply	10/31/12	15	Clear	109	87	.022	.096	Trace	0.40	0.25	60.0	53.0	2.20	400	+	+	+	..
mden	Tap, public supply	11/30/12	10	Trace	76	58	.012	.092	Trace	0.40	0.50	50.0	46.0	2.60	450	+	+	—	..
najoharie	Tap, public supply	2/ 2/12	Trace	Clear	148	123	.010	.010	.001	0.10	0.50	112.8	113.0	0.50	60	+	—	—	..
najoharie	Tap, public supply	4/ 4/12	Trace	Clear	377	320	.006	.042	Trace	0.20	31.00	243.0	194.0	0.50	350				..
najoharie	Tap, public supply	5/ 3/12	Trace	Clear	135	114	.004												
najoharie	Tap, public supply																		

Canaseraga	Tap, public supply	3/30/12	5	Trace	178	165	.008	.016	Trace	0.36	0.75	154.2	130.0	0.90	1,500	+	—	—
Canaseraga	Tap, public supply	10/ 5/12	Trace	Clear	207	185	.004	.018	.001	0.36	1.50	148.6	145.0	0.80	8,100	—	—	—
Canaseraga	Tap, public supply	11/23/12	Trace	Clear	200	285	.012	.016	Trace	0.60	1.75	151.4	144.0	0.10	500	—	—	—
Canastota	Tap, public supply	2/ 6/12	5	15	1,014	908	.014	.038	.004	1.20	5.25	600.0	196.0	1.00	1,400	+	+	—
Canastota	Tap, public supply	3/18/12	Trace	Clear	864	853	.032	.064	.002	1.02	3.75	614.0	188.0	1.20	25,000	+	+	—
Canastota	Tap, public supply	4/26/12	15	15	680	591	.006	.064	.003	0.80	3.00	428.5	185.0	2.10	5,000	+	+	+
Canastota	Tap, public supply	9/24/12	15	5	1,099	1,030	.001	.058	.001	0.02	4.00	743.0	175.0	2.40	13,000	+	+	—
Canastota	Tap, public supply	10/29/12	25	20	940	862	.008	.124	.001	0.50	5.25	600.0	192.0	3.20	29,500	+	+	+
Canastota	Tap, public supply	11/27/12	5	Trace	954	846	.012	.066	Trace	0.70	5.00	600.0	188.0	2.00	500	+	+	—
Canastota	Tap, public supply	12/28/12	Trace	5	875	810	.022	.052	.001	1.20	3.75	514.0	204.0	2.10	9,500	+	+	—
Candor	Tap, public supply	1/11/12	Trace	Trace	30	24	.036	.026	.001	0.40	1.00	14.65	11.0	0.10	70	—	—	—
Candor	Tap, public supply	3/19/12	10	10	35	26	.014	.046	Trace	0.36	0.75	19.5	10.0	1.00	2,900	+	+	—
Candor	Tap, public supply	4/25/12	Trace	Clear	25	19	.002	.028	.001	0.14	0.75	11.1	8.0	0.55	950	—	—	—
Candor	Tap, public supply	11/29/12	Trace	Clear	41	27	.014	.040	Trace	0.30	1.50	18.2	16.0	0.60	15	+	—	—
Canisteo	Tap, public supply	1/ 6/12	5	5	222	212	.004	.008	.001	0.52	1.75	208.0	206.0	0.60	700	+	—	—
Canisteo	Tap, public supply	2/22/12	Trace	Trace	246	208	.022	.048	Trace	0.68	2.25	201.5	203.0	0.70	500	+	+	+
Canisteo	Tap, public supply	3/29/12	5	Clear	219	204	.010	.024	Trace	0.52	1.50	200.0	196.0	0.80	100	+	—	—
Canisteo	Tap, public supply	11/22/12	....	....	....	....	....	....	....	....	....	....	....	....	50	—	—	—
Canton	Tap, public supply	1/ 8/12	55	10	107	51	.020	.122	Trace	0.30	1.00	29.9	25.0	24.00	300	+	+	—
Canton	Tap, public supply	2/12/12	....	....	....	....	....	....	....	....	....	....	....	....	300	+	—	—
Canton	Tap, public supply	3/15/12	35	Trace	130	80	.054	.206	.007	0.26	0.25	58.6	39.0	24.40	2,400	+	+	—
Canton	Tap, public supply	9/ 7/12	90	3	112	77	.002	.146	.001	0.03	0.62	37.7	23.0	26.00	160	+	+	+
Canton	Tap, public supply	10/25/12	80	20	160	70	.020	.228	Trace	0.08	0.50	50.0	34.0	30.80	1,400	+	+	—
Canton	Tap, public supply	12/ 6/12	100	10	82	45	.028	.174	.001	0.10	0.75	22.1	17.0	20.40	4,300	+	+	—
Carthage	Tap, public supply	2/13/12	5	Clear	46	36	.020	.024	Trace	0.68	0.50	16.9	16.0	0.96	230	—	—	—
Carthage	Tap, public supply	3/18/12	30	Clear	54	40	.028	.084	Trace	0.14	0.25	18.2	9.0	6.00	3,100	+	—	—
Carthage	Tap, public supply	4/22/12	25	Clear	53	29	.010	.050	Trace	0.50	0.50	18.2	13.0	3.40	450	+	—	—
Carthage	Tap, public supply	5/ 7/12	5	Clear	59	39	.012	.042	Trace	0.48	0.25	14.3	12.0	2.70	4,400	—	—	—
Carthage	Tap, public supply	9/ 9/12	10	Clear	56	40	.002	.026	Trace	0.56	0.25	24.7	17.0	1.70	2,600	+	—	—
Carthage	Tap, public supply	10/26/12	50	Clear	58	34	.028	.154	Trace	0.54	1.00	18.2	11.0	11.60	600	+	—	—
Carthage	Tap, public supply	12/ 9/12	20	Clear	40	24	.012	.044	.001	0.66	0.50	16.9	13.0	3.80	2,900	—	—	—
Castile	Tap, public supply	1/19/12	Trace	Clear	145	124	.008	.018	Trace	1.20	1.87	120.0	115.0	0.50	40	+	—	—
Castile	Tap, public supply	3/30/12	Trace	Clear	135	123	.012	.026	Trace	1.08	1.50	120.0	111.0	0.70	2,600	+	—	—
Castile	Fountain, public supply	11/21/12	5	Clear	180	167	.012	.042	.001	0.90	1.50	142.8	140.0	0.90	350	—	—	—
Castleton	Tap, public supply	3/14/12	20	50	61	38	.014	.140	.002	0.14	1.00	20.8	10.0	7.60	14,000	+	+	+
Castleton	Tap, public supply	4/15/12	25	15	65	58	.012	.134	.002	0.24	2.00	43.6	33.0	4.40	400	+	—	—
Castleton	Tap, public supply	7/24/12	....	....	....	....	....	....	....	....	....	....	....	....	475	+	+	—
Castleton	Tap, public supply	10/28/12	35	5	125	90	.016	.124	Trace	0.46	2.37	48.6	35.0	5.20	1,000	+	+	—
Catskill	Tap, public supply	1/25/12	20	5	135	105	.034	.116	.003	0.24	3.00	61.4	56.0	12.60	1,900	+	+	—
Catskill	Tap, public supply	3/ 1/12	35	10	127	82	.040	.088	.002	0.16	3.00	57.1	43.0	5.50	36,500	+	+	—
Catskill	Tap, public supply	4/ 6/12	20	75	127	106	.056	.122	.002	0.16	1.50	47.1	40.0	6.50	5,700	+	+	+
Catskill	Tap, public supply	10/ 4/12	35	Trace	148	112	.006	.092	.001	0.20	5.00	74.3	70.0	3.30	300	+	+	—
Catskill	Tap, public supply	11/ 9/12	45	10	99	72	.022	.124	.001	0.14	2.75	57.1	45.0	9.20	1,100	+	+	—
Cattaraugus	Tap, public supply	1/23/12	Trace	Clear	111	100	.010	.012	.001	0.80	0.87	77.1	73.0	0.20	6,000	+	—	—
Cattaraugus	Tap, public supply	9/23/12	Trace	Clear	137	115	.002	.002	.001	0.48	0.75	105.8	79.5	0.10	700	+	—	—
Cattaraugus	Tap, public supply	11/12/12	Trace	Clear	122	100	.012	.034	Trace	0.70	1.00	70.0	68.0	0.30	180	—	—	—
Cattaraugus	Tap, public supply	12/16/12	Trace	Clear	110	99	.008	.028	.001	0.60	1.25	74.3	70.0	0.80	1,200	—	—	—
Casenovia	Tap, public supply	2/ 7/12	Trace	Clear	222	196	.028	.052	Trace	1.60	2.25	191.4	190.0	0.90	100	+	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Casenovia	Tap, public supply	3/18/12	5	10	268	233	.012	.026	.001	0.12	2.75	228.5	216.0	1.60	51,000	+	+	+	..
Casenovia	Tap, public supply	4/27/12	10	10	247	218	.004	.066	.001	0.36	2.25	201.5	191.0	0.70	2,100	+	—	—	..
Casenovia	Tap, public supply	9/25/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,300	+	+	—	..
Casenovia	Tap, public supply	10/30/12	5	Trace	275	245	.016	.030	Trace	0.10	2.75	243.0	232.0	0.50	300	+	—	—	..
Casenovia	Tap, public supply	11/27/12	5	Clear	286	265	.014	.018	Trace	0.02	2.25	257.0	223.0	0.40	70	—	—	—	..
Casenovia	Tap, public supply	12/28/12	Trace	Clear	281	244	.014	.024	.001	0.02	2.25	228.5	226.0	0.80	10	—	—	—	..
Central Valley	Tap, public supply	1/25/12	5	Clear	35	28	.014	.098	.001	0.10	2.25	22.1	10.0	1.40	20	—	—	—	..
Central Valley	Tap, public supply	10/3/12	10	5	49	30	.008	.120	Trace	0.06	3.00	26.0	17.0	2.10	18,000	+	+	—	..
Chaffee	Tap, public supply	2/28/12	Trace	Clear	112	81	.016	.026	.001	2.00	1.50	68.6	60.0	0.10	20	—	—	—	..
Chaffee	Tap, public supply	4/11/12	Trace	Clear	110	88	.010	.018	.001	0.80	2.00	72.9	59.0	0.20	120	—	—	—	..
Chaffee	Tap, public supply	9/26/12	Trace	Clear	164	127	.002	.002	.001	3.00	1.50	114.2	103.0	0.20	1,000	—	—	—	..
Chaffee	Tap, public supply	11/15/12	Trace	Clear	184	160	.034	.012	.001	2.60	1.25	157.2	133.0	0.50	1,900	—	—	—	..
Chaffee	Tap, public supply	12/19/12	Trace	Clear	98	84	.040	.038	Trace	1.20	1.50	77.1	70.0	0.10	350	—	—	—	..
Champlain	Tap, public supply	1/5/12	15	Trace	82	58	.022	.044	.001	0.80	1.00	52.9	38.0	4.10	200	+	—	—	..
Champlain	Tap, public supply	2/8/12	15	Clear	80	61	.030	.054	Trace	0.68	1.12	45.7	45.0	2.30	90	+	—	—	..
Champlain	Tap, public supply	3/14/12	5	Clear	83	66	.022	.050	.001	0.60	0.75	60.0	49.0	2.20	180	—	—	—	..
Champlain	Tap, public supply	4/18/12	50	Trace	68	36	.032	.160	.001	0.16	0.50	29.9	21.0	8.30	400	—	—	—	..
Champlain	Tap, public supply	9/9/12	30	Trace	140	109	.002	.080	Trace	0.06	0.50	52.9	51.0	4.50	51,000	+	—	—	..
Champlain	Tap, public supply	12/5/12	50	10	69	43	.020	.188	Trace	0.20	1.00	37.7	26.0	12.40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Charlotte	Raw water, village plant	2/16/12	.....																
Charlotte	Filtered water, villa[illegible]																		
Charl[illegible]																			

Chateaugay	Tap, public supply	9/7/12	Trace	Clear	136	114	.002	.002	Trace	1.60	1.75	77.1	67.0	0.10	110	−	−	−	..
Chateaugay	Tap, public supply	10/25/12	Trace	Clear	130	88	.010	.050	.001	2.00	1.50	75.7	74.0	0.50	300	+	−	−	..
Chateaugay	Tap, public supply	12/5/12	Trace	Trace	97	74	.006	.030	Trace	4.00	1.75	71.4	62.0	1.50	100	+	−	−	..
Chatham	Tap, public supply	1/20/12	8	2	130	108	.008	.022	Trace	2.00	5.62	70.0	54.0	0.10	20	+	−	−	..
Chatham	Tap, public supply	2/27/12	Trace	Clear	144	124	.016	.032	Trace	2.00	6.75	67.1	58.0	0.20	30	−	−	−	..
Chatham	Tap, public supply	3/29/12	Trace	Clear	133	109	.020	.010	Trace	1.80	5.75	78.6	55.0	0.30	110	+	+	−	..
Chatham	Tap, public supply	5/21/12	Trace	Clear	134	118	.004	.018	Trace	1.60	6.12	62.9	47.0	0.40	50	+	−	−	..
Chatham	Tap, public supply	8/31/12	Trace	Clear	183	160	.002	.004	.001	4.80	12.50	80.0	59.0	0.10	15	+	−	−	..
Chatham	Tap, public supply	10/18/12	...	...	...	...	...	...	...	...	...	...	...	...	30	+	−	−	..
Chester	Tap, public supply	1/26/12	Trace	Clear	29	21	.024	.098	.001	0.04	2.00	19.5	12.0	1.30	90	+	−	−	..
Chester	Tap, public supply	2/29/12	Trace	Clear	29	21	.034	.096	Trace	0.06	2.00	19.5	12.0	1.80	170	+	−	−	..
Chester	Tap, public supply	4/3/12	5	Clear	44	29	.022	.086	Trace	0.04	1.75	22.1	10.0	1.40	20	−	−	−	..
Chester	Tap, public supply	10/4/12	Trace	Clear	52	30	.002	.088	.001	0.02	2.00	19.5	15.0	1.50	200	−	−	−	..
Chester	Tap, public supply	11/8/12	Trace	Clear	36	26	.010	.104	.001	0.04	2.00	18.2	11.0	1.80	...	+	−	−	..
Chester	Tap, public supply	12/27/12	5	Clear	35	25	.024	.096	.001	0.06	2.00	16.9	12.0	1.70	10	+	−	−	..
Clayton	Tap, public supply	4/20/12	5	Clear	141	130	.008	.048	.003	0.03	6.75	102.8	93.0	1.50	50	+	+	−	..
Clayton	Tap in power house, public supply	6/11/12	...	...	...	...	...	...	...	...	...	...	...	...	30	+	−	−	..
Clayton	Tap in pump station, public supply	11/20/12	...	...	...	...	...	...	...	...	...	...	...	...	400	+	−	−	..
Clayton	Tap, St. Lawrence river at intake, public supply	11/20/12	5	Trace	147	127	.010	.088	001	0.06	7.75	111.4	96.0	2.10	300	−	−	−	..
Clifton Springs	Tap, public supply	1/13/12	Trace	Clear	312	273	.016	.026	Trace	3.20	4.62	243.0	243.0	0.10	80	−	−	−	..
Clifton Springs	Tap, public supply	2/21/12	10	Trace	294	242	.018	.032	Trace	3.20	4.00	235.5	225.0	1.60	1,000	+	+	−	..
Clifton Springs	Tap, public supply	4/3/12	15	Trace	274	255	.006	.018	Trace	2.88	3.25	250.0	210.0	1.10	100	−	−	−	..
Clifton Springs	Tap, public supply	10/9/12	5	5	352	282	.006	.008	Trace	2.00	3.75	264.5	246.0	0.60	600	+	−	−	..
Clifton Springs	Tap, public supply	11/26/12	Trace	Clear	332	290	.004	.034	Trace	3.00	4.00	264.5	246.0	0.70	200	+	−	−	..
Clifton Springs	Tap, public supply	12/30/12	Trace	Clear	303	...	.016	.030	Trace	4.00	4.75	243.0	235.0	0.60	230	−	−	−	..
Clinton	Tap, public supply	1/3/12	5	Trace	556	492	.022	.070	Trace	0.50	5.25	335.5	186.0	1.60	800	+	−	−	..
Clinton	Tap, public supply	2/15/12	Trace	Clear	902	816	.010	.034	Trace	0.68	8.25	557.0	192.0	0.10	30	+	−	−	..
Clinton	Tap, public supply	3/26/12	Trace	Trace	763	618	.010	.038	Trace	0.72	6.25	421.5	172.0	0.60	950	+	−	−	..
Clinton	Tap, public supply	5/3/12	5	5	526	487	.008	.052	.001	0.48	4.00	328.5	157.0	0.60	300	−	−	−	..
Clinton	Tap, public supply	6/20/12	Trace	Trace	860	809	.004	.008	.001	0.90	4.00	439.0	168.0	0.40	150	−	−	−	..
Clinton	Tap, public supply	9/14/12	Trace	Clear	1,155	1,107	.002	.020	.001	0.24	9.25	743.0	135.0	1.10	210	+	−	−	..
Clinton	Tap, public supply	10/22/12	5	Clear	1,012	831	.006	.042	Trace	0.30	8.75	686.0	166.0	1.00	140	−	−	−	..
Clinton	Tap, public supply	12/3/12	5	Trace	683	626	.020	.044	Trace	0.50	6.50	435.5	207.0	1.00	70	−	−	−	..
Clyde	Tap, public supply	1/12/12	Trace	Clear	356	318	.020	.016	.001	0.06	14.25	201.5	159.0	1.70	15	−	−	−	..
Clyde	Tap, public supply	2/20/12	10	Clear	508	420	.026	.026	Trace	0.04	16.00	312.0	170.0	1.36	20	−	−	−	..
Clyde	Tap, public supply	3/23/12	Trace	Clear	545	492	.050	.054	.001	0.08	14.00	350.0	168.0	1.50	1,300	+	−	−	..
Clyde	Tap, public supply	4/26/12	5	Clear	780	709	.034	.026	.010	0.16	15.75	500.0	185.0	1.50	110	−	−	−	..
Clyde	Tap, public supply	10/10/12	5	Clear	293	269	.004	.042	Trace	0.04	13.00	221.5	164.0	1.30	70	−	−	−	..
Clyde	Tap, public supply	11/19/12	Trace	Clear	371	311	.022	.044	Trace	0.02	14.50	203.0	167.0	1.20	10	−	−	−	..
Clyde	Tap, public supply	12/21/12	Trace	Clear	365	317	.010	.040	.001	0.10	12.25	188.6	167.0	1.80	70	−	−	−	..
Cobleskill	Tap, public supply	2/2/12	10	5	106	81	.058	.116	.005	0.68	2.00	58.6	56.0	2.40	160	+	+	−	..
Cobleskill	Tap, public supply	9/10/12	6	40	100	81	.048	.232	.001	0.10	1.75	58.6	51.0	6.20	37,000	+	+	+	..
Cobleskill	Tap, public supply	12/27/12	20	30	129	116	.046	.146	.004	1.02	2.00	70.0	61.0	2.80	800	+	−	−	..
Cohocton	Tap, public supply	1/6/12	5	5	66	44	.006	.028	Trace	1.60	2.75	35.1	18.0	0.70	2,500	+	−	−	..
Cohocton	Tap, public supply	2/14/12	Trace	Clear	176	144	.014	.008	Trace	0.60	5.25	142.8	139.0	0.10	10	−	−	−	..
Cohocton	Tap, public supply	3/22/12	10	10	57	33	.012	.046	Trace	1.02	1.75	20.8	16.0	2.30	2,500	+	−	−	..
Cohocton	Tap, public supply	10/7/12	10	Trace	72	55	.004	.038	.001	1.00	3.00	32.5	31.0	1.50	9,800	+	+	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per cc..	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Cohocton	Tap, public supply	11/25/12	5	Trace	73	57	.006	.052	.002	1.40	3.00	32.5	24.0	1.00	500	+	—	—	..
Cohoes	Raw Mohawk river water	1/11/12	20	15	118	89	.062	.088	.003	0.40	2.62	72.9	62.0	4.60	2,700	+	+	—	..
Cohoes	Purified water, high pressure service	1/11/12	10	Trace	101	81	.062	.042	.001	0.40	2.87	74.3	54.0	2.00	30	—	—	—	..
Cohoes	Effluent filter unit No. 6	1/11/12	......	......	......	......	......	......	......	......	......	......	......	......	130	+	—	—	..
Cohoes	Raw Mohawk river water	1/29/12	15	5	156	141	.140	.070	.002	0.60	4.37	102.8	86.0	3.52	80	+	+	+	..
Cohoes	Purified water, high pressure service	1/29/12	5	Trace	151	138	.142	.042	.001	0.60	4.50	108.6	75.0	1.56	1	—	—	—	..
Cohoes	Effluent filter unit No. 2	1/29/12	......	......	......	......	......	......	......	......	......	......	......	......	20	+	—	—	..
Cohoes	Effluent filter unit No. 4	1/29/12	......	......	......	......	......	......	......	......	......	......	......	......	10	+	—	—	..
Cohoes	Tap in trolley waiting room, public supply	2/13/12	10	5	175	134	.292	.120	.004	0.60	5.50	97.6	92.0	4.04	290	+	+	—	..
Cohoes	Tap in pump house, high pressure service	2/14/12	20	5	172	142	.232	.134	.004	0.40	5.75	105.8	95.0	3.20	380	+	+	+	..
Cohoes	Raw Mohawk river water	3/12 12	25	5	155	121	.156	.149	.004	0 26	4.75	80.0	78.0	6.50	2,900	+	+	+	..
Cohoes	Raw Mohawk river water	4/11/12	10	45	127	92	.036	.144	.002	0.34	1.75	52.9	47.0	6.00	4,100	+	+	+	..
Cohoes	Purified water, high pressure service	4/11/12	8	Clear	102	80	.036	.046	Trace	0.34	2.00	61.4	35.0	1.00	10	—	—	—	..
Cohoes	Tap, McDermott's drug store, public supply	4/11/12	......	......	......	......	......	......	......	......	......	......	......	......	10	—	—	—	..
															160	+	+	+	..
	[illegible]	4 11 12	......	......	......	......	......	......	......	......	......	......	......	......	90	+	+	—	..

Cohoes	Effluent filter unit No. 1	10/29/12	....	....	....	....	....	....	....	....	....	....	....	....	150	+	+	—	..
Cohoes	Effluent filter unit No. 8	10/29/12	....	....	....	....	....	....	....	....	....	....	....	....	80	+	+	—	..
Cohoes	Raw water	12/12/12	30	70	124	103	.050	.096	.005	0.30	2.87	67.1	45.0	6.80	6,900	+	+	+	..
Cohoes	Purified water	12/12/12	10	10			.052	.066	.001	0.30	3.00	71.4	62.0	2.80	425	—	—	—	..
Cohoes	Effluent filter unit No. 5	12/12/12	....	....	....	....	....	....	....	....	....	....	....	....	750	+	—	—	..
Cold Spring	Tap, public supply	1/16/12	5	Clear	72	51	.028	.046	Trace	0.08	2.25	23.4	18.0	0.10	30	+	—	—	..
Cold Spring	Tap, public supply	2/20/12	5	Clear	56	49	.018	.044	Trace	0.08	2.25	27.3	25.0	1.35	50	+	—	—	..
Cold Spring	Tap, public supply	3/26/12	Trace	Trace	64	42	.022	.054	Trace	0.04	1.50	22.1	12.0	0.50	40	—	—	—	..
Cold Spring	Tap, public supply	4/30/12	10	Clear	50	36	.008	.072	Trace	Trace	1.62	24.7	18.0	1.00	170	+	—	—	..
Cold Spring	Tap, public supply	8/27/12	30	10	44	32	.002	.088	Trace	0.10	1.37	29.9	28.0	3.00	3,400	+	+	—	..
Cold Spring	Tap, public supply	10/15/12	10	Clear	78	63	.004	.078	.001	0.06	2.37	44.3	35.0	1.70	70	—	—	—	..
Cold Spring	Tap, public supply	12/17/12	10	Clear	56	43	.028	.054	.001	0.02	2.25	27.3	24.0	1.70	60	—	—	—	..
Cooks Falls	Tap, public supply	1/27/12	10	3	42	21	.010	.018	.001	0.14	1.25	19.5	15.0	0.10	10	—	—	—	..
Cooks Falls	Tap, public supply	10/11/12	18	5	37	21	.004	.016	.001	0.10	1.00	19.5	17.0	1.00	200	—	—	—	..
Cooks Falls	Tap, public supply	11/13/12	5	12	34	26	.014	.040	Trace	0.04	1.00	16.9	10.0	1.30	50	—	—	—	..
Cooks Falls	Tap, public supply	12/31/12	Trace	Clear	44	....	.012	.010	Trace	0.10	1.00	12.7	9.0	0.90	20	+	—	—	..
Cooperstown	Tap, public supply	2/ 2/12	2	Clear	139	117	.016	.078	Trace	0.18	2.00	97.2	97.0	1.50	50	—	—	—	..
Cooperstown	Tap, public supply	3/ 6/12	Trace	Clear	117	106	.014	.070	Trace	0.16	1.25	84.3	77.0	1.90	550	—	—	—	..
Cooperstown	Tap, public supply	4/ 9/12	Trace	5	126	112	.004	.058	Trace	0.16	1.25	105.8	99.0	2.30	500	+	—	—	..
Cooperstown	Tap, public supply	10/24/12	5	Trace	117	107	.010	.114	Trace	0.12	1.75	92.9	91.0	2.00	100	—	—	—	..
Corinth	Tap, public supply	1/31/12	Trace	Clear	31	18	.020	.026	.001	0.14	0.25	16.9	9.0	1.80	80	+	—	—	..
Corinth	Tap, public supply	3/14/12	15	Clear	31	24	.048	.062	Trace	0.14	0.25	20.8	12.0	1.20	210	—	—	—	..
Corinth	Sturtevant creek, intake crib	7/13/12	12	2	95	75	.012	.042	.001	0.16	0.75	44.3	....	2.20	375	+	—	—	..
Corinth	Lower reservoir	7/13/12	12	2	93	71	.004	.070	.001	0.04	0.50	35.1	35.0	2.40	90	+	—	—	..
Corinth	Upper reservoir	7/13/12	....	....	....	....	....	....	....	....	....	....	....	....	100	+	+	—	..
Corinth	Tap, public supply	7/13/12	....	....	....	....	....	....	....	....	....	....	....	....	450	+	+	—	..
Corning	Tap, public supply	1/ 9/12	Trace	Clear	363	315	.014	.022	.001	3.20	21.0	191.4	184.0	0.10	15	+	—	—	..
Corning	Tap, public supply	2/14/12	Trace	Clear	334	262	.024	.030	Trace	4.00	21.5	201.5	172.0	0.34	10	—	—	—	..
Corning	Tap, public supply	3/21/12	Trace	Clear	323	282	.014	.012	Trace	3.20	20.0	201.5	165.0	1.50	100	+	—	—	..
Corning	Tap, public supply	10/ 7/12	5	Clear	322	283	.004	.012	.001	1.20	21.25	208.0	175.0	0.70	20	—	—	—	..
Corning	Tap, public supply	11/26/12	Trace	Clear	347	282	.008	.010	Trace	3.40	21.25	177.6	173.0	1.80	10	—	—	—	..
Cornwall	Tap, public supply	1/23/12	5	1	52	37	.006	.038	.001	0.16	1.62	19.5	9.0	2.40	475	+	+	—	..
Cornwall	Tap, public supply	2/28/12	10	20	40	30	.003	.058	.001	0.10	1.50	15.6	3.0	3.00	6,800	+	+	+	..
Cornwall	Tap, public supply	4/ 2/12	5	Trace	26	19	.006	.022	Trace	0.08	1.00	12.7	6.0	0.80	300	+	—	—	..
Cornwall	Upper reservoir	6/15/12	....	....	....	....	....	....	....	....	....	....	....	....	2,500	+	—	—	..
Cornwall	Black Rock reservoir	6/15/12	25	5	50	29	.010	.042	.001	0.06	1.12	15.6	15.0	2.50	1,100	+	+	—	..
Cornwall	Tap, public supply	6/15/12	....	....	....	....	....	....	....	....	....	....	....	....	40	+	—	—	..
Cornwall	Tap, public supply	10/ 2/12	5	None	40	28	.010	.054	.001	0.04	1.75	19.5	12.0	2.20	600	+	+	—	..
Cornwall	Tap, public supply	11/ 7/12	15	Trace	43	30	.010	.082	.001	0.06	2.50	20.8	12.0	2.70	2,700	+	+	—	..
Cornwall	Tap, public supply	12/27/12	5	Trace	31	22	.036	.044	Trace	0.06	2.75	18.2	9.0	2.10	80	+	—	—	..
Cortland	Tap, public supply	2/ 8/12	Trace	Clear	144	128	.020	.030	Trace	1.60	1.87	114.2	111.0	0.20	150	—	—	—	..
Cortland	Tap, public supply	3/18/12	15	10	131	110	.018	.070	Trace	1.08	1.25	98.6	83.0	1.00	4,600	+	+	—	..
Cortland	Tap, public supply	4/29/12	Trace	Clear	141	121	.006	.024	.001	1.20	1.75	120.0	106.0	0.30	475	—	—	—	..
Cortland	Tap, public supply	9/25/12	Trace	Clear	187	165	.008	.022	.001	1.20	2.25	148.6	129.0	0.40	50	+	+	—	..
Cortland	Tap, public supply	10/30/12	Trace	Clear	157	139	.008	.018	.001	1.00	2.00	134.2	133.0	0.70	30	+	—	—	..
Cortland	Tap, public supply	11/29/12	Trace	Clear	166	141	.024	.016	Trace	1.40	2.00	140.0	130.0	1.00	20	—	—	—	..
Cortland	Tap, public supply	12/28/12	Trace	Clear	169	147	.020	.058	Trace	1.20	2.50	125.8	122.0	0.50	15	—	—	—	..
Coxsackie	Tap, public supply	1/22/12	5	5	149	118	.032	.050	.001	0.52	2.87	114.2	101.0	0.40	190	+	—	—	..

Analytical Results of Samples of Water — (*Continued*)

City, Town or Village	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Coxsackie	Tap, public supply	3/ 1/12	5	5	115	100	.026	.054	.002	0.40	2.50	61.4	56.0	1.50	4,900	+	+	—	..
Coxsackie	Tap, public supply	4/ 6/12	5	15	107	99	.005	.054	.001	0.34	2.00	74.3	63.0	1.90	300	+	—	—	..
Coxsackie	Tap, public supply	10/ 5/12	5	Trace	177	168	.010	.040	Trace	0.06	2.25	134.2	122.0	2.00	325	+	+	—	..
Coxsackie	Tap, public supply	11/ 9/12	15	5	121	108	.010	.070	.001	0.24	2.75	77.1	67.0	1.80	1,100	+	+	—	..
Coxsackie	Overflow at dam, Diep Kill supply	12/21/12	15	10	125	113	.006	.064	.001	0.24	2.75	78.6	70.0	2.60	5,100	+	+	+	..
Coxsackie	Reservoir, Climax supply	12/21/12	15	3	109	93	.010	.040	.001	0.24	2.25	61.4	53.0	3.00	2,600	+	+	—	..
Coxsackie	Tap, public supply	12/21/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,600	+	+	+	..
Crown Point	Tap, public supply	1/ 4/12	10	Trace	190	170	.024	.022	.001	0.20	1.00	162.8	163.0	0.30	60	+	—	—	..
Crown Point	Tap, public supply	2/ 7/12	Trace	Clear	180	164	.008	.022	Trace	0.24	1.25	162.8	161.0	0.10	30	—	—	—	..
Crown Point	Tap, public supply	3/13/12	Trace	Clear	194	186	.006	.036	Trace	0.20	1.12	177.2	158.0	0.30	30	—	—	—	..
Crown Point	Tap, public supply	4/16/12	5	Clear	225	203	.002	.012	Trace	0.08	1.00	185.8	168.0	0.20	30	—	—	—	..
Crown Point	Tap, public supply	9/ 5/12	Trace	Clear	203	177	.004	.002	.001	0.16	1.00	154.2	154.0	0.30	3,900	+	—	—	..
Crown Point	Tap, public supply	10/23/12	Trace	Clear	248	219	.006	.048	Trace	0.14	0.87	208.0	190.0	0.20	20	—	—	—	..
Crown Point	Tap, public supply	12/ 4/12	Trace	Clear	197	182	.018	.032	Trace	0.20	1.25	177.2	161.0	0.60	100	—	—	—	..
Cuba	Tap, public supply	1/23/12	Trace	Clear	152	140	.020	.022	.001	0.64	5.50	105.8	99.0	0.50	750	+	+	—	..
Cuba	Tap, public supply	2/23/12	Trace	Clear	140	122	.020	.034	Trace	0.68	6.25	91.4	90.0	0.70	230	+	—	—	..
Cuba	Tap, public supply	4/13/12	Trace	Clear	110	97	.004	.014	Trace	0.44	4.50	80.0	78.0	0.60	120	+	+	—	..
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.001	[illegible]	[illegible]	78.0		0.20	750	+	+	—	..

Delevan	Tap, public supply	4/11/12	Trace	Clear	180	191	.002	.024	.001	0.46	0.75	130.0	115.0	0.30	110	+	−	−
Delevan	Tap, public supply	6/28/12	Trace	Clear	147	132	.004	.004	Trace	0.80	0.75	125.8	121.0	0.30	3,900	−	−	−
Delevan	Overflow from dam of emergency supply	11/11/12													14,000	+	+	−
Delevan	Catch basin at springs	11/11/12	Trace	Trace	148	136	.008	.048	.001	0.70	0.50	125.8	121.0	1.40	48,500	+	−	−
Delevan	Tap, public supply	11/11/12													53,000	+	+	−
Delevan	Tap, public supply	12/19/12	Trace	Clear	142	120	.014	.016	Trace	0.90	1.25	117.2	116.0	0.60	400	−	−	−
Delhi	Tap, public supply	1/29/12	5	15	41	87	.018	.044	Trace	0.80	1.25	20.8	11.0	0.80	1,500	+	−	−
Delhi	Tap, public supply	3/10/12	10	10	47	25	.018	.092	.001	1.02	1.75	24.7	10.0	2.20	2,800	+	+	−
Delhi	Tap, public supply	4/12/12	10	Trace	23	17	.014	.052	.001	0.50	0.75	16.9	5.0	1.30	200	+	−	−
Delhi	Tap, public supply	10/11/12	10	Clear	48	31	.004	.070	Trace	0.12	1.25	26.0	20.0	1.80	990	+	+	−
Delhi	Tap, public supply	11/15/12	5	5	35	22	.014	.082	Trace	0.04	1.00	19.5	8.0	0.90	210	+	−	−
Depew	Tap, public supply	1/24/12	5	15	160	125	.020	.068	.004	0.10	8.50	105.8	96.0	2.05	60	+	−	−
Depew	Tap, public supply	1/25/12													100	−	−	−
Depew	Tap, public supply	3/5/12	5	10	140	160	.008	.032	Trace	0.14	7.75	91.4	88.0	0.90	33,000	−	−	−
Depew	Tap, public supply	4/20/12	10	18	140	114	.003	.068	.001	0.14	7.00	94.2	88.0	1.10	650	+	+	−
Depew	Tap, public supply	9/19/12	3	Trace	159	119	.003	.070	.001	0.06	7.50	94.2	92.0	1.30	950	+	+	−
Depew	Tap, public supply	11/7/12	10	10	141	112	.014	.084	.001	0.06	7.25	100.0	97.0	1.50	800	−	−	−
Depew	Tap, public supply	12/19/12	10	30	158	133	.010	.094	.001	0.10	8.50	97.2	96.0	1.80	323	+	+	−
Deposit	Tap, public supply	2/1/12	2	Trace	34	23	.026	.028	Trace	0.60	1.50	15.6	6.0	1.40	120	+	−	+
Deposit	Tap, public supply	4/11/12	10	10	50	28	.010	.008	.001	0.43	0.75	11.1	2.0	1.20	300	+	+	−
Deposit	Tap, public supply	10/11/12	10	15	38	32	.004	.040	Trace	0.24	1.00	20.8	13.0	1.80	27,000	+	+	−
Deposit	Tap, public supply	11/15/12	5	8	33	24	.012	.050	Trace	0.50	1.00	19.5	9.0	0.90	500	+	+	+
De Ruyter	Tap, public supply	2/7/12	Trace	Clear	42	16	.022	.084	Trace	0.60	0.75	14.3	14.0	0.90	50	+	−	−
De Ruyter	Tap, public supply	3/18/12	5	Clear	40	38	.024	.048	Trace	0.40	0.25	23.4	13.0	1.70	4,300	+	−	−
De Ruyter	Tap, public supply	4/27/12	10	Trace	45	21	.004	.052	Trace	0.20	0.50	15.6	9.0	1.90	80	+	−	−
De Ruyter	Tap, public supply	9/24/12	30	10	61	29	.004	.132	.001	0.10	1.25	20.8	14.0	10.00	3,400	+	+	−
De Ruyter	Tap, public supply	10/30/12	15	Trace	46	32	.004	.102	.001	0.14	0.75	23.4	12.0	3.80	5,300	+	−	−
De Ruyter	Tap, public supply	11/27/12	10	5	43	33	.004	.006	Trace	0.26	1.25	16.9	14.0	2.60	375	+	−	−
De Ruyter	Tap, public supply	12/28/12	10	3	35	26	.012	.060	Trace	0.26	0.25	19.5	12.0	1.60	600	−	−	−
Dolgeville	Reservoir	5/1/12	15	Clear	35	24	.004	.046	Trace	0.14	0.25	22.1	21.0	2.10	190	−	−	−
Dolgeville	Tap, public supply	8/20/12													400	+	−	−
Dolgeville	Tap, public supply	10/31/12	5	Trace	44	32	.018	.048	.001	0.24	0.75	27.3	27.0	1.70	70	−	−	−
Dover Plains	Tap, public supply	1/19/12	5	Clear	48	37	.024	.020	.001	0.20	1.50	26.0	23.0	0.20	70	+	−	−
Dover Plains	Tap, public supply	2/28/12	Trace	Clear	44	34	.006	.030	.001	0.24	1.50	19.5	15.0	1.00	9,400	−	−	−
Dover Plains	Tap, public supply	3/29/12	10	Trace	38	24	.006	.046	.001	0.14	1.75	16.9	12.0	1.60	2,000	+	+	−
Dover Plains	Tap, public supply	5/3/12	Trace	Trace	46	34	.002	.048	Trace	0.02	0.75	20.8	20.0	1.20	60	−	−	−
Dover Plains	Tap, public supply	8/30/12	Trace	Clear	83	60	.002	.018	Trace	0.12	1.12	41.6	40.0	0.70	600	+	+	+
Dover Plains	Tap, public supply	10/18/12	Trace	Clear	58	46	.002	.054	Trace	0.02	1.62	40.3	40.0	1.00	110	+	−	−
Dover Plains	Tap, public supply	12/21/12	10	Trace	60	44	.014	.056	.001	0.12	1.50	27.3	23.0	1.80	1,600	+	−	−
Dryden	Tap, public supply	1/13/12	Trace	Clear	163	131	.006	.008	.001	1.60	1.75	122.8	119.0	0.40	15	−	−	−
Dryden	Tap, public supply	2/12/12	Trace	Clear	157	145	.008	.010	Trace	2.00	1.75	131.4	126.0	0.40	20	−	−	−
Dryden	Tap, public supply	3/20/12	Trace	Clear	144	123	.010	.010	Trace	1.02	1.25	120.0	117.0	0.40	1,800	+	+	+
Dryden	Tap, public supply	4/25/12	Trace	Clear	152	136	.002	.010	.001	1.50	1.50	125.8	118.0	0.80	1,900	−	−	−
Dryden	Tap, public supply	9/30/12	Trace	Clear	200	172	.002	.006	.001	2.40	1.50	140.0	123.0	0.30	200	+	+	−
Dryden	Tap, public supply	11/1/12	Trace	Clear	176	159	.008	.054	.001	2.10	1.75	137.2	126.0	0.20	100	+	+	−
Dryden	Tap, public supply	12/28/12	Trace	Clear	174	153	.016	.008	Trace	1.80	1.25	125.8	120.0	0.40	55,000	−	−	−
Dunkirk	Tap, public supply	2/28/12	5	10	139	109	.004	.072	.001	0.14	7.75	94.2	90.0	1.30	1,100	+	−	−
Dunkirk	Tap, public supply	4/16/12	15	30	142	116	.006	.062	.001	0.08	6.50	95.3	84.0	1.40	5,500	+	+	+

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Dunkirk	Tap, public supply	9/20/12	15	5	166	139	.004	.094	.001	0.06	7.50	102.8	88.0	2.50	200	+	+	—	..
Dunkirk	Tap, public supply	12/14/12	15	40	166	140	.014	.084	001	0.06	8.25	94.2	93.0	3.20	1,400	+	+	—	..
Earlville	Tap, public supply	1/ 4/12	15	5	63	46	.028	.074	Trace	1.08	1.75	36.4	26.0	1.50	210	+	—	—	..
Earlville	Tap, public supply	2/17/12	10	12	68	41	.024	.086	.002	0.90	2.12	35.1	29.0	3.38	275	+	—	—	..
Earlville	Tap, public supply	3/27/12	10	2	81	65	.010	.060	.003	0.80	1.75	45.7	25.0	1.00	350	+	+	—	..
Earlville	Tap, public supply	5/ 2/12	15	Clear	55	34	.004	.070	Trace	0.34	1.00	19.5	15.0	2.40	60	+	—	—	..
Earlville	Tap, public supply	9/14/12	20	44	171	149	.018	.176	Trace	0.04	5.50	122.8	115.0	4.00	5,700	+	+	+	..
Earlville	Tap, public supply	10/23/12	20	20	80	68	.016	.170	Trace	0.10	1.25	45.7	40.0	4.40	8,600	+	—	—	..
Earlville	Tap, public supply	12/ 4/12	5	Trace	68	52	.032	.104	Trace	0.36	2.00	36.4	29.0	0.70	400	—	—	—	..
East Aurora	Tap, public supply	2/28/12	Trace	Clear	299	259	.006	.022	.003	2.80	11.25	185.8	163.0	0.30	500	+	—	—	..
East Aurora	Tap, public supply	4/10/12	3	5	310	260	.006	.042	.003	3.00	10.25	177.2	168.0	0.50	650	+	—	—	..
East Aurora	Tap, public supply	9/26/12	Trace	Trace	312	281	.002	.002	.001	0.02	3.25	228.5	210.0	0.60	1,500	—	—	—	..
East Aurora	Tap, public supply	11/15/12	Trace	Clear	278	252	.003	.022	Trace	0.02	3.50	221.5	200.0	1.00	300	—	—	—	..
East Aurora	Tap, public supply	12/19/12	Trace	Clear	292	268	.016	.032	Trace	0.02	3.00	221.5	210.0	0.70	230	—	—	—	..
East Randolph	Tap, public supply	4/15/12	Trace	Clear	83	64	.002	.010	.001	0.80	1.00	62.9	56.0	Trace	1,440	—	—	—	..
East Randolph	Tap, public supply	9/23/12	......	......	......	......	......	......	......	......	......	......	......	......	1,600	—	—	—	..
East Syracuse	Tap, public supply	1/12/12	5	5	294	244	.006	.032	.001	1.60	2.62	228.5	219.0	1.10	375	+	—	—	..

Ellenville	Tap, public supply	7/16/12	Trace	Clear	69	53	.002	.016	.001	0.16	2.25	45.7	41.0	0.20	76,500	+	+	−	..
Ellenville	South Gully stream	9/18/12	Trace	Clear	75	58	.002	.008	.001	0.02	2.25	32.5	21.0	0.70	100,000	+	+	−	..
Ellenville	Tap, public supply	10/ 8/12	5	Clear	77	64	.004	.032	Trace	0.42	2.00	50.0	48.0	0.70	650	−	−	−	..
Ellenville	Tap, public supply	11/13/12	8	Clear	35	21	.020	.052	Trace	0.02	1.50	18.2	8.0	2.00	400	+	+	−	..
Elizabethtown	Tap, public supply	5/ 9/12	Trace	Clear	91	70	.006	.028	Trace	0.20	0.25	48.6	48.0	0.50	20	−	−	−	..
Ellicottville	Catch basin at Marsh spring	11/ 7/12	Trace	Trace	31	22	.014	.048	.001	0.20	0.50	12.7	8.0	1.40	1,900	+	+	−	..
Ellicottville	Reservoir at overflow	11/ 7/12	Trace	2	56	43	.014	.052	.001	0.60	0.50	32.5	24.0	0.90	130	−	−	−	..
Ellicottville	Discharge of pump in village	11/ 7/12	Trace	Clear	134	119	.014	.020	.001	0.86	2.25	102.8	101.0	0.10	10	−	−	−	..
Ellicottville	Tap, public supply	12/16/12	Trace	Clear	46	40	.014	.022	.001	0.36	0.75	28.6	24.0	0.40	100	+	−	−	..
Elmira	Raw water, public supply	1/10/12	......	......	143	121	.050	.030	.001	0.80	5.37	90.0	65.0	0.70	375	+	+	−	..
Elmira	Filtered water, public supply	1/10/12	Trace	Clear	175	135	.078	.060	.010	1.20	6.37	114.2	100.0	1.35	2	−	−	−	..
Elmira	Raw water, public supply	2/13/12	10	Trace	186	169	.078	.066	.001	0.90	6.37	117.2	94.0	0.77	550	+	−	−	..
Elmira	Filtered water, public supply	2/13/12	Trace	Clear	52	31	.016	.234	.002	0.26	1.25	18.2	13.0	15.20	20	−	−	−	..
Elmira	Raw water, public supply	3/21/12	40	100	39	30	.022	.074	Trace	0.36	1.75	19.5	4.0	2.90	25,000	+	+	+	..
Elmira	Filtered water, public supply	3/21/12	5	Clear	90	55	.038	.064	Trace	0.50	3.00	41.6	24.0	2.00	20	−	−	−	..
Elmira	Tap, New York State Reformatory	3/22/12	Trace	Clear	117	101	.020	.082	.002	0.68	3.00	67.1	47.0	3.20	1,100	−	−	−	..
Elmira	Raw water, public supply	4/24/12	25	15	103	89	.022	.048	.001	0.80	3.50	70.0	39.0	1.30	4,900	+	+	+	..
Elmira	Filtered water, public supply	4/24/12	Trace	Clear	142	111	.004	.046	.001	0.34	5.25	77.1	66.0	1.60	10	−	−	−	..
Elmira	Tap, New York State Reformatory	6/12/12	Trace	2											40	−	−	−	..
Elmira	Ice from reservoir, New York State Reformatory	6/12/12	......	......	......	......	......	......	......	......	......	......	......	......	10	−	−	−	..
Elmira	Tap, New York State Reformatory	7/10/12	Trace	Clear	223	178	.008	.052	.001	0.26	7.75	94.3	78.0	1.60	40	+	−	−	..
Elmira	Tap, New York State Reformatory	8/13/12	Trace	Clear	142	120	.004	.038	Trace	0.24	8.75	90.0	76.0	1.40	......	......	......	......	..
Elmira	Tap, public supply	10/ 8/12	10	Clear	68	51	.024	.068	.002	0.30	1.75	41.6	27.0	2.30	......	−	−	−	..
Elmira	Tap, New York State Reformatory	10/23/12	Trace	Clear	147	120	.010	.064	Trace	0.30	5.25	94.2	76.0	1.20	120	−	−	−	..
Elmira	Reservoir for refrigeration purposes	10/23/12	......	......	......	......	......	......	......	......	......	......	......	......	5,000	+	+	−	..
Elmira	Raw water, public supply	11/26/12	25	5	......	......	.006	.162	.001	0.04	1.37	41.6	34.0	3.60	200	+	−	−	..
Elmira	Filtered water, public supply	11/26/12	Trace	Clear	77	59	.008	.090	Trace	0.02	1.87	44.3	32.0	1.80	10	−	−	−	..
Elmira	Tap, New York State Reformatory	12/ 3/12	Trace	Clear	121	93	.014	.052	Trace	0.50	5.00	60.0	53.0	1.20	10	−	−	−	..
Elmira	Reservoir, New York State Reformatory, for refrigeration purposes	12/ 3/12	......	......	......	......	......	......	......	......	......	......	......	......	50	−	−	−	..
Endicott	Tap, public supply	4/10/12	5	Clear	308	246	.010	.036	.001	0.02	59.00	174.2	152.0	0.40	140	−	−	−	..
Falconer	Tap, public supply	4/15/12	Trace	Clear	121	101	.012	.002	.002	Trace	2.50	91.4	86.0	Trace	20	−	−	−	..
Fayetteville	Tap, public supply	2/22/12	Trace	Clear	467	428	.002	.014	.001	1.80	2.25	335.5	163.0	0.50	240	+	+	−	..
Fayetteville	Tap, public supply	4/ 3/12	Trace	Clear	373	341	.004	.008	Trace	0.14	1.75	257.0	172.0	0.10	50	+	−	−	..
Fayetteville	Tap, public supply	4/27/12	Trace	Clear	365	300	.004	.030	Trace	1.80	2.00	264.5	171.0	0.60	60	−	−	−	..
Fayetteville	Tap, public supply	10/ 9/12	5	Trace	454	370	.006	.012	.001	1.40	1.75	335.5	176.0	0.70	30	−	−	−	..
Fayetteville	Tap, public supply	11/26/12	Trace	Clear	485	448	.006	.050	Trace	1.76	2.25	343.0	185.0	0.20	10	−	−	−	..
Fishkill-on-the-Hudson	Tap, public supply	2/20/12	......	......	......	......	......	......	......	......	......	......	......	......	50	+	−	−	..
Fishkill-on-the-Hudson	Tap, public supply	4/30/12	Trace	Clear	36	25	.002	.036	Trace	Trace	1.37	20.8	13.0	1.60	60	−	−	−	..
Fishkill-on-the-Hudson	Tap, public supply	8/27/12	7	Clear	25	15	.002	.044	.001	0.06	1.75	9.5	6.0	1.40	14,500	+	+	−	..
Fishkill-on-the-Hudson	Tap, public supply	10/15/12	10	5	82	64	.014	.076	.001	0.06	2.00	14.3	3.0	1.90	180	+	+	−	..
Fishkill-on-the-Hudson	Tap, public supply	12/17/12	5	Clear	42	30	.030	.042	Trace	0.02	2.50	19.5	11.0	1.10	210	+	−	−	..

Analytical Results of Samples of Water — (*Continued*)

City, town or village	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Florida	Tap, public supply	1/25/12	15	Clear	49	39	.034	.156	Trace	0.04	1.50	18.2	14.0	2.60	120	—	—	—	..
Florida	Tap, public supply	4/ 4/12	15	Clear	36	31	.010	.078	Trace	0.04	1.50	16.9	13.0	2.30	110	—	—	—	..
Fonda	Tap, public supply	2/ 2/12	Trace	Clear	251	226	.024	.052	Trace	0.50	1.25	221.5	219.0	0.30	50	+	+	—	..
Fonda	Tap, public supply	4/ 4/12	10	Clear	217	185	.008	.030	Trace	0.26	1.00	182.0	181.0	0.90	300	+	—	—	..
Fonda	Tap, public supply	6/21/12	2	10	242	225	.006	.068	.001	0.24	1.25	214.5	207.0	0.80	......	....	....	....	..
Fonda	Tap, public supply	9/13/12	Trace	Clear	260	240	.002	.024	Trace	0.12	1.12	221.5	196.0	0.80	80	+	+	—	..
Fonda	Tap, public supply	10/31/12	10	Clear	262	232	.006	.086	Trace	1.00	2.25	221.5	220.0	1.30	275	+	—	—	..
Fonda	Tap, public supply	12/11/12	5	Clear	242	205	.006	.042	.001	0.80	2.00	194.2	187.0	1.00	600	+	—	—	..
Forestport	Tap, public supply	12/10/12	25	Clear	60	47	.012	.056	Trace	0.14	0.37	36.4	35.0	4.40	70	+	—	—	..
Forestville	Tap, public supply	4/17/12	20	5	150	124	.010	.044	Trace	0.24	1.25	102.8	84.0	1.90	400	+	+	—	..
Forestville	Tap, public supply	11/13/12	10	Trace	130	115	.008	.048	Trace	0.26	1.00	100.0	87.0	2.00	52,000	+	+	—	..
Forestville	Tap, public supply	12/16/12	Trace	Clear	149	139	.012	.048	.001	0.30	1.75	114.2	99.0	1.40	20,500	—	—	—	..
Fort Ann	Copeland pond, proposed source of supply	5/27/12	17	1	41	30	.022	.130	Trace	0.04	0.37	22.1	20.0	4.00	150	+	—	—	..
Fort Ann	Kane's Falls, above dam, proposed source of supply	5/27/12	......	......	......	......	......	......	......	......	......	......	......	......	500	+	+	—	..
Fort Ann	Kane's Falls, below dam, proposed [illegible]	5/27/12	......	......	......	......	......	......	......	......	......	......	......	......	1,300	+	+	+	..
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.50	15.6	13.0	0.10	60	+	—	—	..

Ellenville	Tap, public supply	7/16/12	Trace	Clear	69	53	.002	.016	.001	0.16	2.25	45.7	41.0	0.20	76,500	+	+	—	..
Ellenville	South Gully stream	9/18/12	Trace	Clear	75	58	.002	.008	.001	0.02	2.25	32.5	21.0	0.70	100,000	+	+	—	..
Ellenville	Tap, public supply	10/ 8/12	5	Clear	77	64	.004	.022	Trace	0.42	2.00	50.0	48.0	0.70	650	—	—	—	..
Ellenville	Tap, public supply	11/13/12	8	Clear	35	21	.020	.052	Trace	0.02	1.50	18.2	8.0	2.00	400	+	+	—	..
Elizabethtown	Tap, public supply	5/ 9/12	Trace	Clear	91	70	.006	.028	Trace	0.20	0.25	48.6	48.0	0.50	20	—	—	—	..
Ellicottville	Catch basin at Marsh spring	11/ 7/12	Trace	Trace	31	22	.014	.018	.001	0.20	0.50	12.7	8.0	1.40	1,900	+	+	—	..
Ellicottville	Reservoir at overflow	11/ 7/12	Trace	2	56	43	.014	.052	.001	0.60	0.50	32.5	24.0	0.90	130	—	—	—	..
Ellicottville	Discharge of pump in village	11/ 7/12	Trace	Clear	134	119	.014	.020	.001	0.80	2.25	102.8	101.0	0.10	10	—	—	—	..
Ellicottville	Tap, public supply	12/16/12	Trace	Clear	46	40	.014	.022	.001	0.36	0.75	28.6	24.0	0.40	100	+	—	—	..
Elmira	Raw water, public supply	1/10/12	......	......	......	......	......	......	......	......	......	......	......	......	375	+	+	—	..
Elmira	Filtered water, public supply	1/10/12	Trace	Clear	113	121	.050	.030	.001	0.80	5.37	90.0	65.0	0.70	2	—	—	—	..
Elmira	Raw water, public supply	2/13/12	10	Trace	175	135	.078	.060	.010	1.20	6.37	114.2	100.0	1.35	550	+	—	—	..
Elmira	Filtered water, public supply	2/13/12	Trace	Clear	186	169	.078	.066	.001	0.90	6.37	117.2	94.0	0.77	20	—	—	—	..
Elmira	Raw water, public supply	3/21/12	40	100	52	31	.016	.234	.002	0.26	1.25	18.2	13.0	15.20	25,000	+	+	+	..
Elmira	Filtered water, public supply	3/21/12	5	Clear	39	30	.022	.074	Trace	0.36	1.75	19.5	4.0	2.90	20	—	—	—	..
Elmira	Tap, New York State Reformatory	3/22/12	Trace	Clear	90	55	.038	.064	Trace	0.50	3.00	41.6	24.0	2.00	1,100	—	—	—	..
Elmira	Raw water, public supply	4/24/12	25	15	117	101	.020	.082	.002	0.68	3.00	67.1	47.0	3.20	4,900	+	+	+	..
Elmira	Filtered water, public supply	4/24/12	Trace	Clear	103	89	.022	.048	.001	0.80	3.50	70.0	39.0	1.30	10	—	—	—	..
Elmira	Tap, New York State Reformatory	6/12/12	Trace	2	142	111	.004	.046	.001	0.34	5.25	77.1	66.0	1.60	40	—	—	—	..
Elmira	Ice from reservoir, New York State Reformatory	6/12/12	......	......	......	......	......	......	......	......	......	......	......	......	10	—	—	—	..
Elmira	Tap, New York State Reformatory	7/10/12	Trace	Clear	223	178	.008	.052	.001	0.26	7.75	94.3	78.0	1.60	40	+	—	—	..
Elmira	Tap, New York State Reformatory	8/13/12	Trace	Clear	142	120	.004	.038	Trace	0.24	8.75	90.0	76.0	1.40	......	......	......	......	..
Elmira	Tap, public supply	10/ 8/12	10	Clear	68	51	.024	.068	.002	0.30	1.75	41.6	27.0	2.30	......	—	—	—	..
Elmira	Tap, New York State Reformatory	10/23/12	Trace	Clear	147	120	.010	.064	Trace	0.30	5.25	94.2	76.0	1.20	120	—	—	—	..
Elmira	Reservoir for refrigeration purposes	10/23/12	......	......	......	......	......	......	......	......	......	......	......	......	5,000	+	+	—	..
Elmira	Raw water, public supply	11/26/12	25	5	......	......	.006	.162	.001	0.04	1.37	41.6	34.0	3.60	200	+	—	—	..
Elmira	Filtered water, public supply	11/26/12	Trace	Clear	77	59	.008	.090	Trace	0.02	1.87	44.3	32.0	1.80	10	—	—	—	..
Elmira	Tap, New York State Reformatory	12/ 3/12	Trace	Clear	121	93	.014	.052	Trace	0.50	5.00	60.0	53.0	1.20	10	—	—	—	..
Elmira	Reservoir, New York State Reformatory, for refrigeration purposes	12/ 3/12	......	......	......	......	......	......	......	......	......	......	......	......	50	—	—	—	..
Endicott	Tap, public supply	4/10/12	5	Clear	308	246	.010	.036	.001	0.02	59.00	174.2	152.0	0.40	140	—	—	—	..
Falconer	Tap, public supply	4/15/12	Trace	Clear	121	101	.012	.002	.002	Trace	2.50	91.4	86.0	Trace	20	—	—	—	..
Fayetteville	Tap, public supply	2/22/12	Trace	Clear	467	428	.002	.014	.001	1.80	2.25	335.5	163.0	0.50	240	+	+	—	..
Fayetteville	Tap, public supply	4/ 3/12	Trace	Clear	373	341	.004	.008	Trace	0.14	1.75	257.0	172.0	0.10	50	+	—	—	..
Fayetteville	Tap, public supply	4/27/12	Trace	Clear	365	300	.004	.030	Trace	1.80	2.00	264.5	171.0	0.60	60	—	—	—	..
Fayetteville	Tap, public supply	10/ 9/12	5	Trace	454	370	.006	.012	.001	1.40	1.75	335.5	176.0	0.70	30	—	—	—	..
Fayetteville	Tap, public supply	11/26/12	Trace	Clear	485	448	.006	.050	Trace	1.76	2.25	343.0	185.0	0.20	10	—	—	—	..
Fishkill-on-the-Hudson	Tap, public supply	2/20/12	......	......	......	......	......	......	......	......	......	......	......	......	50	+	—	—	..
Fishkill-on-the-Hudson	Tap, public supply	4/30/12	Trace	Clear	36	25	.002	.036	Trace	Trace	1.37	20.8	13.0	1.60	60	—	—	—	..
Fishkill-on-the-Hudson	Tap, public supply	8/27/12	7	Clear	25	15	.002	.044	.001	0.06	1.75	9.5	6.0	1.40	14,500	+	+	—	..
Fishkill-on-the-Hudson	Tap, public supply	10/15/12	10	5	82	64	.014	.076	.001	0.06	2.00	14.3	3.0	1.90	180	+	+	—	..
Fishkill-on-the-Hudson	Tap, public supply	12/17/12	5	Clear	42	30	.030	.042	Trace	0.02	2.50	19.5	11.0	1.10	210	+	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Gloversville	Tap, Kingsboro supply	2/22/12	Trace	Clear	139	122	.010	.032	Trace	0.80	3.25	100.0	98.0	0.50	550	+	—	—	..
Gloversville	Tap, municipal supply	4/ 6/12	15	Trace	47	31	.016	.048	Trace	0.12	0.25	16.9	9.0	3.30	300	+	—	—	..
Gloversville	Tap, Kingsboro supply	4/ 6/12	10	5	134	119	.006	.058	Trace	0.78	2.25	95.7	89.0	1.70	950	+	+	—	..
Gloversville	Tap, municipal supply	6/22/12	15	Trace	48	37	.002	.054	.001	0.16	0.62	23.4	21.0	2.70	70	+	+	—	..
Gloversville	Tap, Kingsboro supply	6/22/12	5	5	140	123	.014	.092	.001	0.90	3.00	114.2	103.0	1.40	300	—	—	—	..
Gloversville	Tap, municipal supply	9/13/12	22	Clear	63	52	.002	.054	Trace	0.14	0.25	40.3	29.0	3.40	450	+	—	—	..
Gloversville	Tap, Kingsboro supply	9/13/12	10	Trace	152	132	.008	.080	.001	0.70	3.00	114.2	96.0	1.00	400	+	—	—	..
Gloversville	Tap, municipal supply	11/ 1/12	35	5	36	26	.014	.114	Trace	0.10	0.75	22.1	14.0	5.40	425	+	—	—	..
Gloversville	Tap, Kingsboro supply	11/ 1/12	Trace	Trace	142	123	.006	.052	.001	0.88	3.25	120.0	106.0	0.50	425	—	—	—	..
Gloversville	Tap, municipal supply	12/12/12	25	5	53	38	.012	.072	Trace	0.12	1.00	20.8	16.0	3.10	375	—	—	—	..
Gloversville	Tap, Kingsboro supply	12/12/12	Trace	3	143	123	.006	.040	Trace	0.80	2.50	102.8	103.0	0.70	110	—	—	—	..
Goshen	Tap, public supply	1/26/12	10	Clear	55	37	.028	.138	.001	0.14	1.75	27.3	14.0	2.30	190	+	—	—	..
Goshen	Tap, public supply	2/29/12	10	5	57	47	.022	.154	Trace	0.14	2.00	27.3	13.0	4.00	3,500	+	—	—	..
Goshen	Tap, public supply	4/ 4/12	15	5	70	54	.008	.128	Trace	0.04	1.50	16.9	10.0	3.60	2,500	+	—	—	..
Goshen	Tap, public supply	10/ 4/12	25	Trace	58	48	.004	.194	Trace	0.06	1.75	32.5	25.0	5.00	1,700	+	—	—	..
Goshen	Tap, public supply	11/ 8/12	22	5	70	38	.014	.212	.001	0.10	2.00	33.8	26.0	5.50	700	—	—	—	..
Goshen	Tap, public supply	12/30/12	20	10	62	40	.040	.186	.001	0.04	0.75	33.8	25.0	4.00	350	—	—	—	..
Gouverneur	Tap, public supply	1/ 9/12	55	Trace	77	45	.026	.104	.013	0.20	0.37	26.0	15.0	18.80	800	+	+	+	..

Granville	Tap, public supply	4/18/12	15	25		80	59	.008	.030	.001	0.34	1.12	44.3	38.0	0.70	200	+	[illegible]	[illegible]
Granville	Tap, public supply	9/17/12	20	50		117	103	.004	.108	.001	0.48	2.00	57.1	56.0	4.60	22,000	+	+	[illegible]
Granville	Tap, public supply	11/12/12	10	Clear		88	74	.010	.054	.001	0.46	1.62	60.0	54.0	1.70	550	+	+	[illegible]
Granville	Tap, public supply	12/27/12	5	Trace		83	65	.016	.090	Trace	0.36	1.50	60.0	59.0	2.00	425	+	+	[illegible]
Greene	Filtered water, W. N. Y. Water Co.	2/16/12	Trace	Clear		154	130	.012	.046	.001	0.14	8.30	114.2	99.0	2.10	40	[illegible]	[illegible]	[illegible]
Greene	Filtered water, W. N. Y. Water Co.	3/ 9/12	Trace	Clear		135	120	.018	.034	Trace	0.12	7.25	91.4	88.0	0.40	350	[illegible]	[illegible]	[illegible]
Greene	Raw water, W. N. Y. Water Co.	4/23/12	10	5		164	143	.008	.064	.001	0.04	8.00	108.6	91.0	2.00	35,000	[illegible]	[illegible]	[illegible]
Greene	Filtered water, W. N. Y. Water Co.	4/23/12	10	1		182	156	.004	.070	.001	0.04	9.25	105.8	92.0	2.00	70	[illegible]	[illegible]	[illegible]
Greene	Raw water, W. N. Y. Water Co.	9/18/12	10	15		156	122	.036	.096	.007	0.10	8.75	111.4	96.0	1.90	3,100	[illegible]	[illegible]	[illegible]
Greene	Filtered water, W. N. Y. Water Co.	9/18/12	5	Clear		169	132	.046	.090	.001	0.12	9.75	120.0	95.0	1.60	25,000	[illegible]	[illegible]	[illegible]
Greene	Raw water, W. N. Y. Water Co.	11/29/12	5	Trace		53	50	.018	.028	.003	0.24	0.87	27.3	22.0	1.20	76,000	[illegible]	[illegible]	[illegible]
Greene	Filtered water, W. N. Y. Water Co.	11/29/12	Trace	Clear		74	68	.008	.028	.003	0.40	1.25	64.3	63.0	0.30	6,200	[illegible]	[illegible]	[illegible]
Greene	Tap, Van Valkenburg supply	1/ 5/12	Trace	Clear		145	135	.022	.010	Trace	0.02	5.75	94.2		0.10	20	[illegible]	[illegible]	[illegible]
Greene	Tap, village supply	1/ 5/12	Trace	Clear		82	77	.004	.006	Trace	0.48	1.50	65.7	64.0	0.40	30	[illegible]	[illegible]	[illegible]
Greene	Tap, Lyon's iron works supply	3/28/12														30	[illegible]	[illegible]	[illegible]
Greene	Tap, village supply	3/28/12														40	[illegible]	[illegible]	[illegible]
Greene	Tap, Lyon's iron works supply	4/30/12														1,600	[illegible]	[illegible]	[illegible]
Greene	Tap, Van Valkenburg supply	4/30/12														40	[illegible]	[illegible]	[illegible]
Greene	Tap, village supply	9/13/12	Trace	Clear		164	142	.002	.004	Trace	1.00	2.00	120.0	118.0	0.20	1,300	-	-	-
Greene	Tap, Van Valkenburg supply	9/13/12	1			100	86	.002	.016	.001	0.10	0.25	70.0	63.0	0.80	4,600	+	-	-
Greene	Tap, village supply	12/ 5/12	5	Clear	1	31	20	.012	.038	.001	0.06	0.75	16.9	6.0	1.20	40	+	-	-
Greene	Tap, Van Valkenburg supply	12/ 5/12	20			42	23	.010	.082	.001	0.14	0.50	19.5	8.0	3.50	1,000	-	-	-
Green Island	Raw water	1/11/12	25	Trace	5	214	191	1.80	.220	.004	0.40	12.10	137.2	137.0	2.40	50	-	-	-
Green Island	Purified water	1/11/12	15			213	188	1.20	.050	.004	0.60	11.87	137.2	137.0	2.60	40	+	-	-
Green Island	Raw water	2/ 6/12	25	Trace	5	209	174	1.20	.300	.008	0.50	14.50	140.0	137.0	2.10	30	+	-	-
Green Island	Purified water	2/ 6/12	10	Clear		226	199	.900	.190	.007	0.72	14.70	145.8	139.0	1.70	20	+	-	-
Green Island	Raw water	3/ 8/12	25	Clear		220	184	3.60	.070	.003	0.48	15.75	140.0	140.0	4.00	20	+	-	-
Green Island	Purified water	3/ 8/12	20	Clear		228	196	3.00	.050	.003	0.90	15.25	142.8	132.0	3.50	10	-	-	-
Green Island	Raw water	4/12/12	20	Trace		243	213	.450	.022	.002	1.50	12.00	148.6	141.0	2.40	60	+	-	-
Green Island	Purified water	4/12/12	5	Clear		251	214	.450	.018	.004	1.50	12.00	148.6	135.0	2.00	10	+	-	-
Green Island	Raw water	5/ 7/12	3	Clear		333	271	3.60	.130	.004	1.70	11.12	195.0	155.0	1.60	30	+	-	-
Green Island	Purified water	5/ 7/12	35		3	335	271	3.60	.120	.002	1.80	11.12	214.5	160.0	2.40	30	+	-	-
Green Island	Raw water	6/10/12	Trace		10	263	222	.390	.090	.001	0.60	18.25	160.0	152.0	2.60	40	-	-	-
Green Island	Purified water	6/10/12	Trace			264	226	.360	.060	.002	0.80	16.00	145.8	142.0	1.30	30	+	+	-
Green Island	Raw water	7/11/12	35	Clear	1	280	245	4.20	.130	.004	0.50	21.50	165.9	165.0	4.30	100	+	-	-
Green Island	Purified water	7/11/12	10			267	238	4.80	.090	.004	0.90	24.20	168.6	168.0	4.00	15	+	-	-
Green Island	Raw water	8/15/12	38	Trace		236	209	4.50	.060	.003	0.40	24.00	171.4	168.0	5.30	25	-	-	-
Green Island	Purified water	8/15/12	Trace	Clear		220	196	4.50	.120	.002	0.60	24.50	162.8	160.0	3.00	6	+	-	-
Green Island	Raw water	10/24/12	35	Clear		256	241	3.60	.220	.010	0.56	19.75	156.0	153.0	5.00	30	+	-	-
Green Island	Purified water	10/24/12	20	Trace		257	226	3.60	.290	.015	1.20	19.00	156.0	154.0	5.00	40	-	-	-
Green Island	Raw water, public supply	11/26/12	20	Clear				2.10	.130	.012	0.40	16.50	154.2	148.0	3.30	10	-	-	-
Green Island	Purified water, public supply	11/26/12	10	Trace		236	203	2.10	.100	.012	0.88	16.50	145.8	144.0	3.80	10	-	-	-
Green Island	Raw water, public supply	12/16/12	20	Clear		227	200	2.40	.060	.008	0.40	16.00	148.6	146.0	3.20	40	-	-	-
Green Island	Purified water, public supply	12/16/12	15	Trace		235	210	1.80	.130	.010	0.72	16.25	148.6	143.0	3.30	30	+	-	-
Greenwich	Tap, public supply	1/30/12	22	Clear		155	120	.052	.076	Trace	0.60	1.62	100.0	95.0	2.94	650	+	-	-
Greenwich	Tap, public supply	3/12/12	30	Clear		112	82	.036	.116	.001	0.68	1.50	71.4	59.0	5.00	1,900	+	+	-
Greenwich	Tap, public supply	4/19/12	30	Trace		125	95	.018	.080	.001	0.36	1.25	87.1	65.0	4.40	210	+	+	-
Greenwich	Tap, public supply	9/18/12	40	Trace	5	182	153	.004	.136	.001	0.14	2.37	117.2	103.0	7.20	1,400	+	+	+

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Greenwich	Tap, public supply	11/13/12	30	Clear	123	105	.018	.120	Trace	0.32	2.25	98.6	81.0	5.50	450	+	+	—	..
Greenwich	Tap, public supply	12/28/12	15	Clear	133	110	.016	.062	.001	0.60	1.50	91.4	88.0	2.50	475	+	—	—	..
Groton	Tap, public supply	1/13/12	5	10	159	131	.016	.084	Trace	0.72	1.50	120.0	119.0	3.80	130	+	—	—	..
Groton	Tap, public supply	2/12/12	5	15	186	135	.022	.116	Trace	0.90	1.25	120.0	118.0	3.10	.....	...	...	...	..
Groton	Tap, public supply	3/20/12	15	10	120	99	.010	.076	Trace	0.68	0.75	85.7	80.0	3.80	3,100	+	+	—	..
Groton	Tap, public supply	4/27/12	10	Clear	151	133	.004	.064	Trace	0.68	1.50	111.4	101.0	3.70	1,500	+	—	—	..
Groton	Tap, public supply	9/28/12	15	5	170	143	.008	.080	.001	0.40	1.25	128.6	125.0	4.60	1,000	+	+	—	..
Groton	Tap, public supply	11/2/12	8	Trace	180	148	.004	.052	Trace	0.60	1.50	134.2	130.0	2.10	300	+	—	—	..
Groton	Tap, public supply	11/30/12	15	5	175	154	.008	.076	.001	0.34	1.25	128.6	126.0	2.40	400	+	—	—	..
Groton	Tap, public supply	12/29/12	10	5	173	151	.014	.058	.001	0.80	1.75	120.0	117.0	1.60	36,000	—	—	—	..
Hamburg	Tap, public supply	1/26/12	2	Clear	331	319	.012	.032	.002	4.00	19.50	228.5	184.0	0.10	2,400	+	—	—	..
Hamburg	Tap, public supply	3/12/12	Trace	Clear	348	311	.020	.030	.001	4.80	20.00	257.0	181.0	0.60	1,150	—	—	—	..
Hamburg	Tap, public supply	4/22/12	Trace	Clear	281	254	.010	.014	.026	4.00	15.75	235.5	172.0	0.10	1,400	+	—	—	..
Hamburg	Tap, public supply	9/28/12	5	Clear	330	300	.154	.040	.025	0.34	13.25	273.0	262.0	1.80	3,700	—	—	—	..
Hamburg	Tap, public supply	11/15/12	5	Clear	330	295	.222	.062	.024	0.22	18.25	286.0	279.0	0.80	80	—	—	—	..
Hamburg	Tap, public supply	12/19/12	5	Trace	356	303	.052	.032	.008	2.60	19.75	250.0	211.0	0.70	90	—	—	—	..
Hamden	Tap, public supply	1/2[illegible]/12	Trace	Trace	38[illegible]	32[illegible]	.034	[illegible]	Trace	[illegible]	1.25	[illegible]	[illegible]	0.70	60	[illegible]	[illegible]	[illegible]	..

Granville	Tap, public supply	4/18/12	15	25	80	59	.008	.030	.001	0.34	1.12	44.3	38.0	0.70	200	+	—	—
Granville	Tap, public supply	9/17/12	20	50	117	103	.004	.108	.001	0.48	2.00	57.1	56.0	4.60	22,000	+	+	+
Granville	Tap, public supply	11/12/12	10	Clear	88	74	.010	.054	.001	0.46	1.62	60.0	54.0	1.70	550	+	+	—
Granville	Tap, public supply	12/27/12	5	Trace	83	65	.016	.060	Trace	0.36	1.50	60.0	59.0	2.00	425	+	—	—
Greece	Filtered water, W. N. Y. Water Co.	2/16/12													40	—	—	—
Greece	Filtered water, W. N. Y. Water Co.	3/9/12	Trace	Clear	154	130	.012	.046	.001	0.14	8.50	114.2	99.0	2.10	350	—	—	—
Greece	Raw water, W. N. Y. Water Co.	4/23/12													35,000	+	+	+
Greece	Filtered water, W. N. Y. Water Co.	4/23/12	Trace	Clear	135	120	.018	.034	Trace	0.12	7.25	91.4	88.0	0.40	70	—	—	—
Greece	Raw water, W. N. Y. Water Co.	9/18/12	10	5	164	143	.008	.064	.001	0.04	8.00	108.6	91.0	2.00	3,100	+	+	+
Greece	Filtered water, W. N. Y. Water Co.	9/18/12	10	1	182	156	.004	.070	.001	0.04	9.25	105.8	92.0	2.00	25,000	—	—	—
Greece	Raw water, W. N. Y. Water Co.	11/20/12	10	15	156	122	.036	.096	.001	0.10	8.75	111.4	96.0	1.90	76,000	+	+	+
Greece	Filtered water, W. N. Y. Water Co.	11/20/12	5	Clear	169	132	.046	.090	.001	0.12	9.75	120.0	95.0	1.60	6,200	+	+	—
Greene	Tap, Van Valkenburg supply	1/5/12	5	Trace	55	50	.018	.028	.003	0.24	0.87	27.3	22.0	1.20	20	—	—	—
Greene	Tap, village supply	1/5/12	Trace	Clear	74	68	.008	.028	.003	0.40	1.25	64.3	63.0	0.30	30	—	—	—
Greene	Tap, Lyon's iron works supply	3/28/12	Trace	Clear	145	135	.022	.010	Trace	0.02	5.75	94.2		0.10	30	—	—	—
Greene	Tap, village supply	3/28/12	Trace	Clear	82	77	.004	.006	Trace	0.48	1.50	65.7	64.0	0.40	40	+	—	—
Greene	Tap, Lyon's iron works supply	4/30/12													1,600	—	—	—
Greene	Tap, Van Valkenburg supply	4/30/12													40	—	—	—
Greene	Tap, village supply	9/13/12	Trace	Clear	164	142	.002	.004	Trace	1.00	2.00	120.0	118.0	0.20	1,300	—	—	—
Greene	Tap, Van Valkenburg supply	9/13/12	1	1	100	86	.002	.016	.001	0.10	0.25	70.0	63.0	0.80	4,600	+	+	—
Greene	Tap, village supply	12/5/12	5	Clear	31	20	.012	.038	.001	0.06	0.75	16.9	6.0	1.20	40	—	—	—
Greene	Tap, Van Valkenburg supply	12/5/12	20	5	42	23	.010	.082	.001	0.14	0.50	19.5	8.0	3.50	1,000	+	+	—
Green Island	Raw water	1/11/12	25	Trace	214	191	1.80	.220	.004	0.40	12.10	137.2	137.0	2.40	50	—	—	—
Green Island	Purified water	1/11/12	15	5	213	188	1.20	.050	.004	0.60	11.87	137.2	137.0	2.60	40	—	—	—
Green Island	Raw water	2/6/12	25	Trace	209	174	1.20	.300	.008	0.50	14.50	140.0	137.0	2.10	30	+	—	—
Green Island	Purified water	2/6/12	10	Clear	226	199	.900	.190	.007	0.72	14.70	145.8	139.0	1.70	20	+	—	—
Green Island	Raw water	3/8/12	25	Clear	220	184	3.60	.070	.003	0.48	15.75	140.0	140.0	4.00	20	+	—	—
Green Island	Purified water	3/8/12	20	Clear	228	196	3.00	.050	.003	0.90	15.25	142.8	132.0	3.50	10	+	—	—
Green Island	Raw water	4/12/12	20	Trace	243	213	.450	.022	.002	1.50	12.00	148.6	141.0	2.40	60	—	—	—
Green Island	Purified water	4/12/12	5	Clear	251	214	.450	.018	.004	1.50	12.00	148.6	135.0	2.00	10	+	—	—
Green Island	Raw water	5/7/12	3	Clear	333	271	3.60	.130	.004	1.70	11.12	195.0	155.0	1.60	30	+	—	—
Green Island	Purified water	5/7/12	35	3	335	271	3.60	.120	.002	1.80	11.12	214.5	160.0	2.40	30	+	—	—
Green Island	Raw water	6/10/12	Trace	10	263	222	.390	.090	.001	0.60	18.25	160.0	152.0	2.60	40	+	—	—
Green Island	Purified water	6/10/12	Trace	Clear	264	226	.360	.060	.002	0.80	16.00	145.8	142.0	1.30	30	—	—	—
Green Island	Raw water	7/11/12	35	1	280	245	4.20	.130	.004	0.50	21.50	165.9	165.0	4.30	100	+	+	—
Green Island	Purified water	7/11/12	10	Trace	267	238	4.80	.090	.004	0.90	24.20	168.6	168.0	4.00	15	+	—	—
Green Island	Raw water	8/15/12	38	Clear	236	209	4.50	.060	.003	0.40	24.00	171.4	168.0	5.30	25	+	—	—
Green Island	Purified water	8/15/12	Trace	Clear	220	196	4.50	.120	.002	0.60	24.50	162.8	160.0	3.00	6	—	—	—
Green Island	Raw water	10/24/12	35	Trace	256	241	3.60	.220	.010	0.56	19.75	156.0	153.0	5.00	30	+	—	—
Green Island	Purified water, public supply	10/24/12	20	Clear	257	226	3.60	.290	.015	1.20	19.00	156.0	154.0	5.00	40	+	—	—
Green Island	Raw water, public supply	11/26/12	20	Trace			2.10	.130	.012	0.40	16.50	154.2	148.0	3.30	10	—	—	—
Green Island	Purified water, public supply	11/26/12	10	Clear	236	203	2.10	.100	.012	0.88	16.50	145.8	144.0	3.80	10	—	—	—
Green Island	Raw water, public supply	12/16/12	20	Trace	227	200	2.40	.060	.008	0.40	16.00	148.6	146.0	3.20	40	—	—	—
Green Island	Purified water, public supply	12/16/12	15	Clear	235	210	1.80	.130	.010	0.72	16.25	148.6	143.0	3.30	30	+	—	—
Greenwich	Tap, public supply	1/30/12	22	Clear	155	120	.052	.076	Trace	0.60	1.62	100.0	95.0	2.94	650	+	+	—
Greenwich	Tap, public supply	3/12/12	30	Trace	112	82	.036	.116	.001	0.68	1.50	71.4	59.0	5.00	1,900	+	+	—
Greenwich	Tap, public supply	4/19/12	30	Trace	125	95	.018	.080	.001	0.36	1.25	87.1	65.0	4.40	210	+	—	—
Greenwich	Tap, public supply	9/18/12	40	5	182	150	.004	.136	.001	0.14	2.37	117.2	103.0	7.20	1,400	+	+	+

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Hilburn	The "Slough" Ramapo river	4/ 5/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	700	+	+	+	..
Hilburn	Reservoir (at dam)	4/ 5/12	20	Clear	23	19	.008	.090	.001	0.02	1.63	9.5	2.0	2.90	150	+	+	—	..
Hilburn	Tap, public supply	4/ 5/12	20	Clear	18	9	.008	.036	Trace	Trace	1.50	4.8	4.0	2.70	9,100	+	—	—	..
Hilburn	Tap, public supply	10/ 4/12	20	5	114	85	.006	.074	.001	0.24	4.50	50.0	25.0	4.70	500	+	+	—	..
Hilburn	Tap, public supply	11/21/12	55	Trace	65	47	.014	.112	Trace	0.04	4.00	23.4	2.0	8.10	7,800	+	—	—	..
Hilburn	Tap, public supply	12/31/12	35	Trace	34	20	.014	.084	.001	Trace	2.75	14.3	2.0	5.00	21,000	+	—	—	..
Holland	Tap, public supply	2/28/12	Trace	Clear	210	163	.006	.012	.001	5.20	6.25	128.6	106.0	0.50	400	+	+	—	..
Holland	Tap, public supply	4/10/12	2	Trace	177	153	.004	.040	Trace	6.80	5.75	98.6	88.0	0.70	180	—	—	—	..
Holland	Tap, public supply	11/16/12	15	15	207	167	.008	.084	Trace	3.00	4.75	134.2	117.0	2.80	34,500	+	+	+	..
Holland	Tap, public supply	12/19/12	Trace	Clear	223	205	.100	.046	.024	2.00	15.20	137.2	137.0	0.50	6,000	+	+	—	..
Holley	Tap, public supply	1/26/12	25	Clear	375	338	.044	.144	.004	2.00	9.75	228.5	195.0	3.90	1,800	+	—	—	..
Holley	Tap, public supply	3/ 4/12	15	Clear	330	269	.004	.094	.001	1.70	7.75	180.0	179.0	1.00	2,600	+	—	—	..
Holley	Tap, public supply	4/23/12	Clear	Trace	256	220	.004	.026	.001	0.90	3.25	182.0	148.0	0.10	550	+	—	—	..
Holley	Tap, public supply	11/21/12	10	Trace	312	274	.014	.094	Trace	1.00	9.50	264.5	220.0	3.50	275	+	—	—	..
Homer	Tap, public supply	2/ 8/12	Trace	Clear	155	140	.020	.026	Trace	0.90	1.87	137.2	136.0	0.10	10	—	—	—	..
Homer	Tap, public supply	3/18/12	Trace	Clear	166	142	.010	.016	Trace	1.02	1.50	137.2	131.0	0.40	10	—	—	—	..
Homer	Tap, public supply	4/29/12	Trace	Clear	149	131	.010	.020	Trace	0.80	1.25	131.2	124.0	0.10	190	—	—	—	..
Homer	Tap, public supply	9/25/12	Trace	Clear	182	138	.004	.016	Trace	0.60	1.75	131.4	.....	0.20	190	—	—	—	..
[illegible]	Tap, public supply	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Hornell	Tap, after passing filters	3/ 4/12														90	+	−	−
Hornell	Tap, 19 Broad street	5/ 4/12														150	+	−	−
Hornell	Tap, after passing filters	5/24/12														200	+	+	−
Hornell	Tap, 193 Main street	5/24/12														300	+	−	−
Hornell	Tap, after passing filters	6/18/12														130	+	−	−
Hornell	Tap, public supply	6/18/12														40	−	−	−
Hornell	Tap, 193 Main street	7/10/12	7	Clear	171	149	.008	.070	.001	0.50	1.50	111.4	106.0	3.00	680	+	−	−
Hornell	Tap, 3 Center street	7/10/12														650	+	−	−
Hornell	Tap, public supply	7/30/12	13	12	118	94	.054	.080	.001	0.60	1.25	60.0	31.0	2.30	500	+	−	−
Hornell	Tap, public supply	10/ 3/12	20	10	91	68	.004	.090	.002	0.60	1.50	48.6	43.0	2.80	400	+	−	−
Hornell	Tap, public supply	11/22/12	7	Trace	91	77	.016	.084	Trace	0.66	1.75	64.3	50.0	2.80	40	+	−	−
Horseheads	Tap, public supply	1/10/12	Trace	Clear	169	149	.016	.034	Trace	0.80	7.50	140.0	126.0	0.40	70	+	−	−
Horseheads	Tap, public supply	2/13/12	Trace	Trace	160	141	.008	.024	Trace	0.90	7.12	131.4	122.0	0.57	170	+	−	−
Horseheads	Tap, public supply	3/21/12	Trace	Clear	370	325	.010	.020	Trace	0.90	6.75	200.0	120.0	0.60	100	−	−	−
Horseheads	Tap, public supply	4/24/12	Trace	Clear	190	161	.004	.016	.002	0.90	7.00	148.6	124.0	1.10	1,500	+	−	−
Horseheads	Tap, public supply	10/ 8/12	5	Clear	221	191	.002	.012	.001	1.00	5.25	142.8	127.0	0.70	1,400	+	−	−
Horseheads	Tap, public supply	11/26/12	Trace	Clear	180	152	.008	.028	Trace	1.40	4.50	131.4	129.0	0.50	90	+	−	−
Hudson	Tap, public supply	2/ 2/12	2	Clear	89	70	.020	.070	Trace	0.26	1.62	39.0	38.0	2.00	100	−	−	−
Hudson	Tap, New York State Training School for Girls, public supply	2/21/12	10	Clear	81	61	.014	.062	.002	0.34	2.00	42.9	41.0	2.10	140	+	−	−
Hudson	Tap, public supply	3/16/12	5	10	79	58	.014	.078	Trace	0.26	1.75	40.3	32.0	3.60	1,100	+	−	−
Hudson	Tap, New York State Training School for Girls, public supply	3/27/12	15	10	66	55	.006	.060	Trace	0.16	1.25	35.1	25.0	2.40	140	−	−	−
Hudson	Tap, public supply	4/17/12	25	5	77	56	.006	.052	Trace	0.14	1.50	27.3	19.0	1.40	800	−	−	−
Hudson	Tap, New York State Training School for Girls, public supply	4/23/12	25	5	77	53	.012	.058	.001	0.14	1.75	29.9	21.0	1.70	150	−	−	−
Hudson	Tap, New York State Training School for Girls, public supply	5/23/12	10	2	63	44	.008	.068	Trace	0.08	1.00	32.5	31.0	1.90	85	−	−	−
Hudson	Tap, New York State Training School for Girls, public supply	6/26/12	10	1	103	81	.004	.054	.001	0.08	0.62	61.4	42.0	2.30	60	−	−	−
Hudson	Tap, New York State Training School for Girls, public supply	7/23/12	35	8	111	88	.008	.100	.001	0.14	1.25	42.9	42.0	2.40	5,000	+	+	−
Hudson	Tap, New York State Training School for Girls, public supply	9/26/12	5	Trace	100	87	.002	.036	.001	0.12	2.00	65.7	42.0	2.00	1,100	+	−	−
Hudson	Tap, New York State Training School for Girls, public supply	10/14/12	10	Trace	68	53	.006	.042	Trace	0.12	1.75	51.4	39.0	2.30		+	−	−
Hudson	Tap, public supply	10/29/12	10	3	75	63	.006	.104	Trace	0.16	1.50	44.3	36.0	2.90	700	+	+	+
Hudson	Tap, New York State Training School for Girls, public supply	11/ 6/12	25	5	64	50	.012	.104	.001	0.12	2.00	39.0	31.0	3.70	400	+	−	−
Hudson	Tap, New York State Training School for Girls, public supply	11/12/12	25	5	90	70	.020	.100	.001	0.14	1.50	35.1	27.0	4.30	325	+	−	−
Hudson	Tap, public supply	12/14/12	20	Clear	66	54	.014	.086	Trace	0.16	1.12	33.8	26.0	4.00	25	−	−	−
Hudson	Tap, New York State Training School for Girls, public supply	12/26/12	15	Clear	62	50	.028	.104	Trace	0.24	2.00	32.5	28.0	3.40	300	+	+	−
Hudson Falls	Tap, public supply	1/ 8/12													150,000	+	−	−
Hudson Falls	Tap, public supply	1/31/12	10	Clear	103	73	.020	.036	.001	1.44	4.50	47.1	37.0	1.30	170	+	−	−
Hudson Falls	Tap, public supply	3/12/12	Trace	Clear	92	75	.022	.058	.001	1.20	5.00	42.9	37.0	1.60	4,000	+	−	−
Hudson Falls	Tap, public supply	4/19/12	15	Trace	131	91	.008	.024	.001	1.20	3.25	72.9	51.0	2.90	60	−	−	−

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Hudson Falls	Tap, public supply	9/18/12	20	Trace	85	61	.002	.026	.001	0.40	2.00	36.4	31.0	4.10	1,000	+	+	—	..
Hudson Falls	Tap, public supply	11/13/12	20	Trace	100	78	.014	.096	.001	1.00	2.50	60.0	41.0	4.50	530	+	—	—	..
Hudson Falls	Tap, public supply	12/28/12	10	Clear	101	77	.010	.058	.001	1.40	4.00	48.6	40.0	2.50	350	—	—	—	..
Ilion	Tap, public supply	2/3/12	Trace	Clear	274	254	.010	.034	Trace	0.72	0.25	206.4	188.0	0.40	30	—	—	—	..
Ilion	Tap, public supply	4/29/12	5	Clear	220	201	.002	.034	.001	0.52	1.00	182.8	170.0	0.60	220	—	—	—	..
Ilion	Tap, public supply	6/20/12	Trace	Trace	235	207	.004	.020	.001	0.50	0.75	167.8	157.0	0.80	750	+	—	—	..
Ilion	Tap, public supply	9/12/12	Trace	Clear	290	260	.002	.026	.002	0.20	0.75	177.2	128.0	1.30	80	+	—	—	..
Ilion	Tap, public supply	10/11/12	5	Trace	210	186	.006	.052	Trace	0.24	1.00	162.5	124.0	2.00	170	+	—	—	..
Ilion	Tap, public supply	11/30/12	10	Clear	207	180	.008	.054	Trace	0.40	0.40	148.6	131.0	2.00	70	+	—	—	..
Industry	Tap, State Agricultural and Industrial School	3/8/12	5	Clear	100	89	.021	.089	Trace	0.16	2.75	68.6	56.0	2.10	800	—	—	—	..
Industry	Tap, State Agricultural and Industrial School	3/27/12	Trace	Clear	108	86	.010	.094	Trace	0.16	2.50	67.1	56.0	0.90	180	—	—	—	..
Industry	Tap, State Agricultural and Industrial School	4/30/12	5	5	92	79	.006	.090	Trace	0.26	2.12	58.6	54.0	0.70	30	—	—	—	..
Industry	Tap, State Agricultural and Industrial School	5/29/12	Trace	2	86	64	.006	.068	Trace	0.24	2.25	55.7	55.0	2.00	50	—	—	—	..
Industry	Tap, State Agricultural and Industrial School	6/25/12	10	Trace	84	61	.004	.076	.001	0.16	2.25	58.6	54.0	2.20	30	—	—	—	

Irvington	Tap, public supply	5/ 6/12	15	3	67	46	.010	.064	Trace	0.04	3.75	16.9	7.0	2.60	40	+	—	—
Jamestown	Tap, public supply	3/ 6/12	Trace	Clear	120	107	.047	.020	.001	0.02	3.00	95.7	81.0	0.50	30	—	—	—
Jamestown	Tap, public supply	4/15/12	Trace	Clear	119	105	.008	.004	.004	Trace	2.50	91.4	85.0	Trace	10	—	—	—
Jamestown	Tap, public supply	8/23/12	Trace	Clear	127	112	.002	.006	.001	Trace	2.50	100.0	81.0	0.30	33,500	—	—	—
Jamestown	Tap, public supply	11/ 9/12	Trace	Clear	125	109	.020	.022	.002	0.04	3.25	90.0	83.0	1.00	130	—	—	—
Jamestown	Tap, public supply	12/13/12	Trace	Clear	117	106	.010	.022	.001	Trace	2.50	85.8	84.0	0.70	80	—	—	—
Jay	Sample taken at dam, public supply	5/23/12													950	+	+	—
Jay	Tap, public supply	5/23/12	25	Clear	47	26	.004	.032	Trace	0.24	0.25	23.4	17.0	6.60	325	+	—	—
Johnstown	Tap, public supply	2/ 2/12	Trace	Clear	104	93	.018	.016	Trace	0.16	0.50	81.4	81.0	0.60	100	+	—	—
Johnstown	Tap, public supply	4/ 6/12	15	Trace	51	41	.016	.052	Trace	0.02	0.25	39.0	34.0	3.20	400	+	+	—
Johnstown	Tap, public supply	6/22/12	Trace	Clear	119	103	.002	.002	.001	0.14	0.50	90.0	88.0	0.60	40	—	—	—
Johnstown	Tap, public supply	9/13/12	5	Trace	139	119	.002	.006	.001	0.12	0.50	111.4	97.0	1.10	650	+	+	—
Johnstown	Tap, public supply	11/ 1/12	5	Clear	88	72	.014	.062	.001	0.08	1.00	67.1	65.0	1.90	110	+	—	—
Johnstown	Tap, public supply	12/12/12	5	Clear	81	70	.010	.048	Trace	0.12	0.75	61.4	55.0	2.80	80	—	—	—
Jordan	Fountain, public supply	1/12/12													80	+	—	—
Jordan	Tap, public supply	2/23/12	15	Clear	604	623	.022	.038	Trace	1.60	2.75	471.0	228.0	0.67	3,500	+	+	—
Jordan	Tap, public supply	3/23/12	5	Clear	492	421	.012	.050	.001	3.40	3.25	343.0	232.0	0.60	250	—	—	—
Jordan	Fountain, public supply	4/26/12	Trace	Clear	456	415	.002	.030	.001	1.80	3.00	303.0	232.0	1.10	80	+	—	—
Jordan	Tap, public supply	12/21/12	Trace	Clear	617	558	.014	.038	.001	1.80	2.75	435.5	248.0	1.40	240	+	—	—
Katonah	Tap, public supply	1/19/12	5	Trace	154	124	.012	.016	.001	1.60	5.25	122.8	112.0	0.10	20	—	—	—
Katonah	Tap, public supply	2/23/12	Trace	Trace	165	142	.014	.012	Trace	1.44	4.75	117.2	108.0	0.20	40	—	—	—
Katonah	Tap, public supply	3/23/12	5	Trace	159	139	.010	.016	Trace	1.70	3.25	109.6	103.0	0.20	25	+	+	—
Katonah	Tap, public supply	5/ 3/12	5	Clear	140	118	.008	.010	Trace	0.80	3.25	94.3	94.0	0.90	30	+	—	—
Katonah	Tap, public supply	8/30/12	Trace	Clear	197	166	.032	.034	Trace	0.96	4.50	122.8	117.0	0.50	170	+	+	—
Katonah	Tap, public supply	10/14/12	Trace	Clear	178	141	.012	.026	Trace	1.20	5.75	128.6	122.0	0.50	300	+	—	—
Katonah	Tap, public supply	12/19/12	5	10	183	162	.040	.048	.061	1.20	5.75	131.4	113.0	0.60	50	—	—	—
Keeseville	Tap, public supply	1/ 5/12	5	Clear	159	147	.053	.032	.007	0.06	1.37	145.8	141.0	2.60	140	+	—	—
Keeseville	Tap, public supply	2/ 7/12	5	Trace	157	145	.050	.038	Trace	0.04	0.87	145.8	145.0	4.10	20	—	—	—
Keeseville	Tap, public supply	3/13/12	3	Clear	174	157	.064	.028	Trace	0.04	1.50	145.8	144.0	3.30	190	—	—	—
Keeseville	Tap, public supply	4/17/12	15	5	176	156	.048	.030	.001	0.02	1.75	117.2		2.90	500	+	—	—
Keeseville	Tap, public supply	9/ 5/12	27	2	162	138	.048	.016	.002	0.08	1.75	111.4		4.90	40	+	—	—
Keeseville	Tap, public supply	10/24/12	15	Trace	162	134	.052	.056	.003	0.06	2.00	131.4		4.50	1,200	+	—	—
Keeseville	Tap, public supply	12/ 5/12	15	Trace	172	149	.058	.022	.003	0.08	2.50	140.0	130.0	3.80	500	+	—	—
Kenmore	Tap, public supply	1/25/12													30	—	—	—
Kenmore	Tap, public supply	9/20/12	3	Trace	153	124	.002	.070	.001	0.06	7.50	120.0	91.0	1.20	20	—	—	—
Kenmore	Tap, public supply	11/16/12	10	10	150	121	.006	.098	.001	0.06	7.50	102.8	98.0	2.50	3,500	+	—	—
Kenmore	Tap, public supply	12/19/12	10		150	128	.030	.090	.001	0.06	8.00	97.2	97.0	3.00	1,400	+	—	—
Kings Park	Tap, boiler house, State Hospital, Long Island	5/16/12													120	—	—	—
Kings Park	Tap, storehouse, State Hospital, Long Island	5/16/12													220	—	—	—
Kings Park	Reservoir, State Hospital, Long Island	5/16/12	7	.5	100	78	.062	.220	.001	0.06	15.20	33.8	27.0	4.00				
Kings Park	New well, State Hospital, Long Island	7/ 6/12									34.50							
Kings Park	New well, State Hospital, Long Island	7/13/12									8.00							
Kings Park	Well No. 1, State Hospital, Long Island	4/15/12									14.00							
Kings Park	Well No. 2, State Hospital, Long Island	4/15/12									13.50							
Kings Park	Well No. 4, State Hospital, Long Island	4/15/12									7.00							
Kings Park	Well No. 6, State Hospital, Long Island	4/15/12									9.50							

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Kings Park	Well No. 7, State Hospital, Long Island	4/15/12									10.00								
Kings Park	Well No. 8, State Hospital, Long Island	4/15/12									9.50								
Kings Park	Well No. 9, State Hospital, Long Island	4/15/12									455.00								
Kings Park	Well No. 10, State Hospital, Long Island	4/15/12									21.00								
Kings Park	Well No. 11, State Hospital, Long Island	4/15/12									815.00								
Kings Park	Well No. 12, State Hospital, Long Island	4/15/12									19.00								
Kings Park	Well No. 15, State Hospital, Long Island	4/15/12									300.00								
Kings Park	Well No. 3, State Hospital, Long Island	4/27/12									12.00								
Kings Park	Well No. 5, State Hospital, Long Island	4/27/12									9.00								
Kings Park	Well No. 13, State Hospital, Long Island	5/ 8/12									8.50								
Kings Park	Well No. 14, State Hospital, Long Island	5/ 8/12									7.50								

Kingston	Tap, low service	4/ 9/12	...	...	...	...	...	...	...	...	...	...	...	...	15	−	−	−	..
Kingston	Tap, high service	4/10/12	...	...	...	...	...	...	...	...	...	...	...	...	40	−	−	−	..
Kingston	Tap, low service	4/10/12	...	...	...	...	...	...	...	...	...	...	...	...	20	−	−	−	..
Kingston	Tap, high service	4/11/12	...	...	...	...	...	...	...	...	...	...	...	...	10	−	−	−	..
Kingston	Tap, low service	4/11/12	...	...	...	...	...	...	...	...	...	...	...	...	70	+	−	−	..
Kingston	Tap, high service	4/12/12	...	...	...	...	...	...	...	...	...	...	...	...	10	−	−	−	..
Kingston	Tap, low service	4/12/12	...	...	...	...	...	...	...	...	...	...	...	...	50	−	−	−	..
Kingston	Tap, high service	4/19/12	...	...	...	...	...	...	...	...	...	...	...	...	15	−	−	−	..
Kingston	Tap, low service	4/19/12	...	...	...	...	...	...	...	...	...	...	...	...	10	−	−	−	..
Kingston	Tap, high service	4/22/12	...	...	...	...	...	...	...	...	...	...	...	...	...	−	−	−	..
Kingston	Tap, low service	4/22/12	...	...	...	...	...	...	...	...	...	...	...	...	60	−	−	−	..
Kingston	Tap, high service	4/25/12	...	...	...	...	...	...	...	...	...	...	...	...	70	−	−	−	..
Kingston	Tap, low service	4/25/12	...	...	...	...	...	...	...	...	...	...	...	...	60	−	−	−	..
Kingston	Tap, high service	4/26/12	...	...	...	...	...	...	...	...	...	...	...	...	20	−	−	−	..
Kingston	Tap, low service	4/26/12	...	...	...	...	...	...	...	...	...	...	...	...	20	−	−	−	..
Kingston	Tap, high service	4/27/12	...	...	...	...	...	...	...	...	...	...	...	...	50	−	−	−	..
Kingston	Tap, low service	4/27/12	...	...	...	...	...	...	...	...	...	...	...	...	15	−	−	−	..
Kingston	Tap, high service	5/ 3/12	...	...	...	...	...	...	...	...	...	...	...	...	170	+	−	−	..
Kingston	Tap, low service	5/ 3/12	...	...	...	...	...	...	...	...	...	...	...	...	48	+	−	−	..
Kingston	Tap, low service	10/ 4/12	Trace	Clear	39	27	.146	.024	.001	0.12	1.75	19.5	15.0	1.00	30	−	−	−	..
Kingston	Tap, high service	10/ 4/12	5	Trace	44	27	.124	.038	.001	0.24	1.25	23.4	14.0	1.00	70	+	−	−	..
Kingston	Tap, low service	11/ 9/12	10	Trace	31	20	.048	.104	Trace	0.16	1.75	14.3	6.0	3.50	400	−	−	−	..
Kingston	Tap, high service	11/ 9/12	20	Trace	36	21	.020	.072	.001	0.14	2.25	15.6	8.0	3.80	600	+	+	−	..
Kingston	Tap, low service	1/25/12	...	...	...	...	...	...	...	...	...	...	...	...	70	+	+	−	..
Lackawanna	Tap, public supply																		
Lackawanna	Suction well at lake pump station, Western N. Y. Water Co.	1/25/12	5	15	139	124	.056	.102	.001	0.10	7.75	100.0	97.0	1.10	90	+	−	−	..
Lackawanna	Tap, public supply	3/ 4/12	Trace	5	152	130	.008	.054	.001	0.16	7.50	97.2	97.0	0.90	80	−	−	−	..
Lackawanna	Tap, public supply	4/20/12	10	30	150	130	.008	.090	.003	0.08	6.25	102.8	85.0	4.50	500	−	−	−	..
Lackawanna	Tap, public supply	9/28/12	15	2	160	136	.002	.052	.001	0.06	7.12	120.0	95.0	2.50	8,100	−	−	−	..
Lackawanna	Tap, public supply	11/15/12	10	10	142	120	.012	.090	Trace	0.04	7.50	100.0	96.0	1.30	110	−	−	−	..
Lackawanna	Tap, public supply	12/19/12	15	20	144	123	.020	.088	.001	0.04	9.00	120.0	92.0	2.00	30,500	+	+	−	..
Lacona	Tap, public supply	1/11/12	Trace	Clear	101	81	.008	.014	.001	0.90	1.37	74.3	73.0	0.30	50	−	−	−	..
Lacona	Tap, public supply	2/29/12	Trace	Clear	101	92	.004	.014	.001	0.90	1.50	74.3	74.0	0.20	100	−	−	−	..
Lacona	Tap, public supply	4/25/12	Trace	Clear	101	91	.002	.018	.001	0.60	1.25	75.7	67.0	1.00	40	−	−	−	..
Lacona	Tap, public supply	10/30/12	Trace	Clear	122	107	.006	.016	Trace	0.80	1.75	102.8	93.0	0.30	20	−	−	−	..
Lake George	Tap, public supply	1/31/12	Trace	Clear	33	19	.004	.014	.001	0.02	0.62	15.6	11.0	0.60	30	+	−	−	..
Lake George	Tap, public supply	3/13/12	Trace	Clear	34	28	.024	.034	Trace	0.04	0.50	27.3	6.0	0.70	40	−	−	−	..
Lake George	Tap, public supply	9/18/12	15	Trace	61	37	.004	.040	.001	0.04	0.50	20.8	20.0	3.30	2,000	−	−	−	..
Lake Placid	Tap, at pumping station	5/18/12	...	...	...	...	...	...	...	...	...	...	...	...	80	−	−	−	..
Lake Placid	Lake Placid, at intake	5/18/12	Trace	Clear	42	22	.012	.064	.001	0.08	0.50	7.9	5.0	2.30	70	−	−	−	..
Lake Placid	Lake Placid, at intake	7/24/12	...	...	...	...	...	...	...	...	...	...	...	...	45	+	+	+	..
Lake Placid	Tap, at pumping station	7/24/12	...	...	...	...	...	...	...	...	...	...	...	...	150	+	+	+	..
Lake Placid	Tap, American Hotel	8/13/12	...	...	...	...	...	...	...	...	...	...	...	...	140	−	−	−	..
Lake Placid	Tap, town hall	8/13/12	...	...	...	...	...	...	...	...	...	...	...	...	100	+	−	−	..
Lake Placid	Lake Placid	8/19/12	...	...	...	...	...	...	...	...	...	...	...	...	300	+	−	−	..
Lake Placid	Reservoir	8/19/12	...	...	...	...	...	...	...	...	...	...	...	...	200	+	−	−	..
Lake Placid	Tap, in typhoid's house	8/19/12	...	...	...	...	...	...	...	...	...	...	...	...	48,000	+	−	−	..
Lake Placid	Tap, in non-typhoid's house	8/19/12	...	...	...	...	...	...	...	...	...	...	...	...	200	−	−	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Lake Placid	Tap, pumping station	8/19/12	......	......	......	......	......	......	......	......	......	......	......	......	20	+	—	—	..
Lake Placid	Tap, town hall	8/19/12	......	......	......	......	......	......	......	......	......	......	......	......	60	—	—	—	..
Lake Placid	Lake Placid water	11/ 5/12	Trace	Clear	24	9	.014	.082	.001	0.04	1.00	7.9	7.0	2.70	......	......	......	......	..
Lake Placid	Tap, Stevens House	12/ 7/12	......	......	......	......	......	......	......	......	......	......	......	......	30	—	—	—	..
Lake Placid	Tap, North Wood's Inn	12/ 7/12	......	......	......	......	......	......	......	......	......	......	......	......	10	—	—	—	..
Lake Placid	Tap, Lengfeld cottage	12/ 7/12	......	......	......	......	......	......	......	......	......	......	......	......	30	—	—	—	..
Lakewood	Tap, public supply	4/15/12	10	Trace	411	386	.318	.020	.002	Trace	104.00	90.0	......	0.40	100	+	—	—	..
Lakewood	Tap, public supply	9/23/12	Trace	Clear	391	371	.004	.014	.001	0.12	62.75	52.9	......	0.60	13,000	+	—	—	..
Lakewood	Tap, public supply	11/11/12	Trace	Clear	340	310	.020	.050	.001	0.20	35.00	48.6	......	0.70	90	—	—	—	..
Lakewood	Tap, public supply	12/12/12	5	Clear	300	276	.006	.016	.001	0.20	23.50	41.6	......	0.50	45	+	—	—	..
Lancaster	Tap, public supply	1/24/12	5	15	164	131	.018	.068	.003	0.10	8.37	108.6	97.0	2.10	70	+	—	—	..
Lancaster	Tap, public supply	3/ 4/12	5	10	153	121	.004	.114	.001	0.16	7.25	120.0	98.0	0.80	160	—	—	—	..
Lancaster	Tap, public supply	4/20/12	10	18	139	108	.006	.048	.001	0.14	7.03	91.4	85.0	0.70	450	+	—	—	..
Lancaster	Tap, public supply	9/19/12	Trace	Clear	141	127	.004	.056	.001	0.04	7.25	120.0	91.0	1.40	100	—	—	—	..
Lancaster	Tap, public supply	11/ 7/12	10	10	142	115	.016	.076	.001	0.06	7.50	102.8	95.0	1.90	100	+	—	—	..
Lancaster	Tap, public supply	12/19/12	10	40	148	126	.011	.078	.001	0.10	8.25	97.2	94.0	1.90	500	+	—	—	..
[illegible]	Tap, public supply	[illegible]	10	Clear	[illegible]	77	.016	.024	Trace	0.52	5.50	45.7	18.0	1.10	60	—	—	—	..

Place	Source	Date
Le Roy	Pumping station, Summit street	4/26/12
Le Roy	Osborne pumping station	4/24/12
Le Roy	Tap, Main street, public supply	4/24/12
Le Roy	Tap, public supply	9/27/12
Le Roy	Tap, public supply	10/ 8/12
Le Roy	Well, canning factory, part of public supply	10/ 8/12
Le Roy	Well, Summit street, part of public supply	10/ 8/12
Le Roy	Well, Osborne street, part of public supply	10/ 8/12
Le Roy	Tap, public supply	10/ 8/12
Le Roy	Well, public supply	11/12/12
Lestershire	Tap, public supply	11/19/12
Lestershire	Tap, public supply	2/10/12
Lestershire	Tap, public supply	3/ 1/12
Lestershire	Tap, public supply	4/2[illegible]/12
Lestershire	Tap, public supply	9/2[illegible]/12
Lestershire	Tap, public supply	10/31/12
Lestershire	Tap, public supply	11/2[illegible]/12
Lestershire	Tap, public supply	12/2[illegible]/12
Lestershire	Tap, public supply	1/2[illegible]/12
Liberty	Tap, public supply	10/ 9/12
Liberty	Tap, public supply	11/13/12
Liberty	Tap, public supply	2/16/12
Lima	Tap, public supply	4/ 2/12
Lima	Tap, public supply	11/26/12
Lima	Tap, public supply	2/ 3/12
Little Falls	Tap, public supply	3/ 1/12
Little Falls	Tap, public supply	6/19/12
Little Falls	Tap, public supply	9/13/12
Little Falls	Tap, public supply	10/11/12
Little Falls	Tap, public supply	11/20/12
Little Falls	Tap, public supply	1/23/12
Little Valley	Tap, public supply	4/15/12
Little Valley	Tap, public supply	9/23/12
Little Valley	Tap, public supply	11/12/12
Little Valley	Tap, public supply	12/16/12
Livonia	Tap, public supply	2/15/12
Livonia	Tap, public supply	4/ 2/12
Livonia	Tap, public supply	11/25/12
Lockport	Tap, public supply	1/24/12
Lockport	Tap, pumping station	3/ 8/12
Lockport	Tap, pumping station	4/20/12
Lockport	Tap, public supply	8/30/12
Lockport	Tap, public supply	9/19/12
Lockport	Tap, public supply	10/ 8/12
Lockport	Tap, public supply	10/15/12
Lockport	Tap, City Hospital, public supply	11/22/12

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Lockport	Tap, public supply	11/22/12	10	15	139	124	.022	.100	Trace	0.36	8.00	102.8	95.0	2.20	600	+	+	—	..
Long Eddy	Tap, public supply	4/11/12	10	5	47	26	.004	.040	Trace	0.08	0.75	12.7	5.0	1.50	900	+	+	—	..
Long Eddy	Tap, public supply	10/11/12	Trace	Clear	41	33	.004	.048	Trace	0.08	1.00	22.1	17.1	1.60	1,400	+	—	—	..
Lowville	Tap, public supply	2/14/12	Trace	Clear	39	28	.024	.046	Trace	1.20	0.37	14.3	7.0	1.30	120	—	—	—	..
Lowville	Tap, public supply	3/19/12	......	......	......	......	......	......	......	......	......	......	......	......	200	—	—	—	..
Lowville	Tap, public supply	4/22/12	Trace	Trace	46	31	.002	.016	Trace	0.80	0.75	9.5	8.0	1.00	400	—	—	—	..
Lowville	Tap, public supply	9/10/12	10	Clear	47	30	.002	.012	Trace	1.02	0.25	16.3	7.0	1.10	220	+	—	—	..
Lowville	Tap, public supply	10/28/12	20	Clear	46	31	.008	.060	Trace	1.00	0.25	14.3	7.0	3.50	1,000	—	—	—	..
Lowville	Tap, public supply	12/ 9/12	40	Clear	35	17	.014	.074	.001	0.72	0.50	15.6	6.0	6.20	350	+	—	—	..
Luserne	Tap, public supply	2/ 1/12	1	Clear	41	31	.016	.018	Trace	0.04	0.75	22.1	22.0	1.00	10	—	—	—	..
Luserne	Tap, public supply	3/13/12	2	Clear	45	36	.014	.030	Trace	0.04	1.00	32.5	24.0	0.60	10	—	—	—	..
Lyons	Raw water, Mud creek, public supply	1/12/12	20	20	642	577	.152	.174	.005	1.00	11.75	416.0	225.0	6.40	800	+	+	—	..
Lyons	Hydrant, public supply	1/12/12	20	20	814	702	.146	.130	.005	0.90	80.00	429.0	229.0	5.90	1,700	+	+	—	..
Lyons	Raw water, Mud creek, public supply	2/20/12	25	25	669	589	.328	.224	.005	0.02	10.25	390.0	215.0	4.55	2,900	+	+	+	..
Lyons	Tap, pumping station	2/20/12	28	20	937	833	.354	.100	.007	0.02	165.00	500.0	220.0	4.06	8,700	+	+	—	..
Lyons	Raw water, Mud creek, public supply	3/23/12	30	200	369	317	.076	.256	.007	0.80	3.25	148.6	100.0	9.80	31,000	+	+	—	..
Lyons	Tap in pumping station, mixed well and Mud creek	3/23/12	30	130	786	661	.082	.182	.011	1.36	240.00	250.0	136.0	6.00	33,000	+	+	—	..
Lyons	Tap, public supply	4/26/12	35	40	693	585	.014	.164	.003	0.80	128.00	371.5	185.0	8.60	15,000	+	+	—	..
Lyons	Tap, public supply	10/10/12	30	15	728	709	.012	.146	.003	0.64	16.25	429.0	227.0	5.70	1,200	+	+	—	..

McConnellsville	Tap, public supply	2/29/12	15	Trace	55	41	.012	.084	Trace	0.36	1.00	32.5	25.0	5.40	300	+	+	–	...
McConnellsville	Tap, public supply	5/ 1/12	45	Clear	54	33	.012	.138	Trace	0.10	0.75	27.3	21.0	7.80	700	+	+	–	...
McConnellsville	Tap, public supply	10/31/12	30	5	68	44	.006	.112	Trace	0.40	1.25	40.3	38.0	4.80	325	+	–	–	...
McConnellsville	Tap, public supply	11/29/12	30	Clear	88	70	.020	.094	.001	0.40	0.75	33.8	27.0	6.60	400	+	–	–	...
McGraw	Tap, public supply	2/ 8/12	Trace	Clear	173	152	.008	.018	Trace	3.60	9.50	120.0	109.0	0.40	150	+	–	–	...
McGraw	Tap, public supply	3/18/12	Trace	Clear	176	154	.018	.026	.001	3.20	9.00	105.8	100.0	0.20	350	–	–	–	...
McGraw	Tap, public supply	4/29/12	Trace	Clear	161	144	.004	.036	.001	2.80	8.25	100.0	94.0	0.10	300	–	–	–	...
McGraw	Tap, public supply	9/25/12	Trace	Clear	210	186	.012	.022	.001	2.40	8.50	148.6	136.0	0.40	120	+	–	–	...
McGraw	Tap, public supply	10/30/12	Trace	Clear	210	173	.010	.062	Trace	2.60	6.75	148.6	143.0	0.60	10	–	–	–	...
McGraw	Tap, public supply	11/29/12	Trace	Clear	204	177	.010	.044	Trace	3.00	9.00	160.0	146.0	1.00	20	–	–	–	...
McGraw	Tap, public supply	12/28/12	Trace	Trace	202	180	.026	.036	Trace	3.00	8.50	154.2	142.0	0.40	10	–	–	–	...
Machias	Tap, public supply	2/26/12	Trace	Clear	122	102	.006	.008	Trace	0.50	0.50	78.6	78.0	0.30	1,200	+	+	–	...
Machias	Tap, public supply	4/12/12	Trace	Clear	95	75	.010	.016	.001	0.48	0.75	67.1	65.0	0.30	20	+	–	–	...
Machias	Tap, public supply	9/25/12	Trace	Clear	130	101	.002	.006	.001	0.48	1.00	88.6	82.0	0.30	130	–	–	–	...
Machias	Tap, public supply	11/14/12	Trace	Clear	108	93	.004	.034	.001	0.54	1.00	71.4	70.0	0.50	240	+	–	–	...
Machias	Tap, public supply	12/17/12	Trace	Clear	99	81	.024	.006	Trace	0.50	0.25	80.0	79.0	0.50	400	–	–	–	...
Madison	Tap, public supply	1/ 3/12	Trace	Clear	168	153	.012	.016	Trace	0.10	0.50	145.8	143.0	1.10	40	+	–	–	...
Madison	Tap, public supply	2/16/12	Trace	Clear	170	143	.006	.008	.001	0.20	0.37	137.2	134.0	0.40	120	+	–	–	...
Malone	Tap, public supply	1/ 6/12	Trace	Clear	105	86	.008	.010	.001	1.08	1.12	85.7	84.0	0.30	160	–	–	–	...
Malone	Tap, public supply	2/ 9/12	Trace	Clear	109	97	.020	.022	Trace	1.20	0.50	87.1	85.0	0.50	50	+	–	–	...
Malone	Tap, public supply	3/15/12	Trace	Clear	117	98	.012	.022	.001	1.20	0.50	94.3	85.0	0.50	170	–	–	–	...
Malone	Tap, public supply	4/18/12	5	Clear	112	92	.002	.028	.001	0.80	0.75	85.7	81.0	1.50	80	–	–	–	...
Malone	Tap, public supply	9/ 6/12	Trace	Clear	125	100	.006	.008	.002	1.40	0.75	90.0	83.0	0.70	130	+	+	–	...
Malone	Tap, public supply	10/24/12	Trace	Clear	113	94	.010	.056	.001	1.00	0.75	92.9	87.0	0.80	70	–	–	–	...
Malone	Tap, public supply	12/ 5/12	Trace	Clear	101	90	.003	.026	.001	1.00	0.50	88.6	78.0	2.00	60	–	–	–	...
Manlius	Tap, public supply	2/22/12	Trace	Clear	244	204	.030	.042	.001	0.80	1.25	201.5	200.0	0.20	45	+	–	–	...
Manlius	Tap, public supply	4/ 3/12	Trace	Clear	255	238	.006	.006	Trace	0.80	1.25	235.5	215.0	0.10	170	+	–	–	...
Manlius	Tap, public supply	4/27/12	Trace	Clear	264	251	.004	.020	Trace	0.80	1.25	243.0	214.0	0.40	10	–	–	–	...
Manlius	Tap, public supply	10/ 9/12	Trace	Clear	269	226	.004	.010	.001	0.30	1.25	221.5	221.0	0.80	480	+	–	–	...
Manlius	Tap, public supply	11/26/12	Trace	Clear	277	258	.006	.020	Trace	0.70	1.50	243.0	220.0	0.50	10	+	–	–	...
Marathon	Tap, public supply	2/ 8/12	Trace	Clear	53	39	.010	.038	Trace	0.60	1.50	31.2	30.0	0.30	40	–	–	–	...
Marathon	Tap, public supply	3/18/12	Trace	Clear	50	36	.008	.028	Trace	0.52	1.00	32.5	27.0	0.70	4,000	–	–	–	...
Marathon	Tap, public supply	4/29/12	Trace	Clear	49	38	.010	.042	Trace	0.50	1.75	33.8	25.0	0.10	120	–	–	–	...
Marathon	Tap, public supply	9/25/12	12	1	60	54	.008	.023	.001	0.12	1.25	37.7	33.0	0.90	250	+	+	+	...
Marathon	Tap, public supply	10/31/12	...	...	...	...	...	...	...	...	...	...	...	...	70	–	–	–	...
Marathon	Tap, public supply	11/29/12	Trace	Clear	55	42	.014	.028	Trace	0.30	1.50	39.0	35.0	0.40	30	–	–	–	...
Marathon	Tap, public supply	12/28/12	Trace	Clear	57	49	.028	.050	.001	0.40	2.50	44.3	35.0	0.70	10	–	–	–	...
Marlboro	Tap, public supply	1/23/12	12	3	67	54	.024	.030	.001	0.48	2.62	30.4	28.0	0.60	100	–	–	–	...
Marlboro	Tap, public supply	10/ 4/12	5	5	99	72	.010	.102	Trace	0.08	2.75	48.6	48.0	0.50	210	+	+	–	...
Marlboro	Tap, public supply	11/11/12	5	Clear	85	68	.022	.094	.001	0.70	3.50	48.6	27.0	1.30	375	+	+	–	...
Massena	Tap, public supply	1/ 8/12	5	Trace	126	107	.020	.074	.001	0.10	6.75	102.8	96.0	1.40	150	+	+	–	...
Massena	Tap, public supply	2/12/12	5	3	151	111	.020	.072	Trace	0.14	7.50	100.0	97.0	1.20	50	+	–	–	...
Massena	Tap, public supply	3/15/12	Trace	Clear	149	126	.018	.052	.001	0.14	7.00	108.6	96.0	1.90	100	+	–	–	...
Massena	Tap, public supply	4/20/12	10	25	150	127	.006	.046	.001	0.08	7.00	91.4	90.0	1.80	1,700	+	+	–	...
Massena	Tap, public supply	9/ 7/12	3	5	177	155	.002	.030	Trace	0.08	7.00	91.4	90.0	1.40	3,000	+	+	–	...
Massena	Tap, public supply	10/25/12	5	5	163	111	.010	.098	.001	0.08	7.87	100.0	96.0	1.90	700	+	+	–	...
Massena	Tap, public supply	12/ 6/12	10	30	166	141	.014	.032	.001	0.10	7.00	114.2	94.0	2.40	13,500	+	+	–	...
Matteawan	Tap, public supply	1/16/12	Trace	Trace	28	18	.024	.068	Trace	0.04	1.82	12.7	5.0	1.10	50	+	+	–	...

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

ITY, TOWN R VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	NITROGEN AS — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. COLI TYPE (+=PRESENT) (—=ABSENT) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
teawan	Tap, public supply	2/20/12	....	....	....	....	....	....	....	....	....	....	....	....	50	+	—	—	..
teawan	Tap, public supply	4/30/12	Trace	Clear	36	25	.002	.036	Trace	Trace	1.37	20.8	13.0	1.60	60	—	—	—	..
teawan	Tap, public supply	8/27/12	7	Clear	25	15	.002	.044	.001	0.06	1.75	9.5	6.0	1.40	14,500	+	+	—	..
teawan	Inlet to "pocket"	10/26/12	5	5	47	37	.018	.070	.003	0.06	3.75	22.1	13.0	1.40	6,700	+	+	—	..
teawan	Gordon brook, below Gordon farm	10/26/12	20	5	64	47	.012	.088	.001	0.06	5.00	23.4	7.0	2.80	5,300	+	+	+	..
teawan	Gordon brook, above Monarch spring	10/26/12	....	....	....	....	....	....	....	....	....	....	....	....	13,000	+	+	—	..
teawan	Fishkill creek, above embroidery mill	10/26/12	50	5	110	80	.024	.226	Trace	0.16	4.00	60.0	41.0	7.80	17,500	+	+	+	..
teawan	Fishkill creek, at electric light plant	10/26/12	50	5	111	80	.026	.242	Trace	0.10	4.00	61.4	40.0	7.40	16,000	+	+	+	..
teawan	Tap, public supply	12/17/12	5	Clear	42	30	.030	.042	Trace	0.02	2.50	19.5	11.0	1.10	210	+	—	—	..
ville	Tap, public supply	3/7/12	Trace	Clear	134	124	.007	.009	Trace	1.80	9.25	104.2	102.0	0.10	30	—	—	—	..
ville	Tap, public supply	4/16/12	Trace	Clear	184	152	.005	.010	Trace	1.50	7.75	120.0	105.0	0.70	160	—	—	—	..
ville	Tap, public supply	9/25/12	Trace	Clear	181	138	.002	.002	Trace	1.80	9.00	117.2	101.0	0.20	80	—	—	—	..
ville	Tap, public supply	11/11/12	Trace	Clear	177	146	.006	.044	.001	1.40	8.25	114.2	107.0	0.80	180	—	—	—	..
ville	Tap, public supply	12/12/12	....	....	....	....	....	....	....	....	....	....	....	....	40	—	—	—	..
hanicville	Tap, public supply	1/17/12	25	20	124	101	.028	.138	.003	0.36	1.50	70.0	63.0	5.80	230	+	—	—	..
hanicville	Tap, public supply	2/8/12	15	20	151	123	.024	.122	Trace	0.26	1.50	75.7	74.0	4.00	190	+	+	—	..
[illegible]ville	Tap, public supply	3/14/12	10	150	112	70	.104	.136	.007	0.16	0.50	27.3	16.5	6.40	18,000	+	+	—	..
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	113	.010	[illegible]	.001	0.03	1.50	72.9	70.0	16.60	1,600	+	+	—	..

Middletown	Filtered water, Highland supply	3/ 1/12	8	Clear	49	37	.034	.178	Trace	0.14	1.00	22.1	18.0	3.30	40
Middletown	Raw water, Monhagen supply	4/ 4/12													150
Middletown	Filtered water, Monhagen supply	4/ 4/12	25	Clear	59	41	.022	.136	Trace	0.10	1.50	21.2	17.0	4.40	70
Middletown	Raw water, Highland supply	4/ 4/12	10	Trace	38	31	.042	.128	Trace	0.06	1.25	24.7	17.0	2.20	140
Middletown	Filtered water, Highland supply	4/ 4/12	10	Clear	51	26	.010	.106	Trace	0.02	1.12	20.8	12.0	3.50	15
Middletown	Tap, State Hospital	4/ 4/12													350
Middletown	Raw water, Monhagen supply	5/10/12													500
Middletown	Filtered water, Monhagen supply	10/ 4/12	5	Clear	73	48	.004	.122	.001	0.04	1.00	26.0	23.0	2.90	26,000
Middletown	Raw water, Highland supply	10/ 4/12													200
Middletown	Filtered water, Highland supply	10/ 4/12	Trace	Clear	70	45	.200	.068	.001	0.08	1.50	34.3	14.0	1.60	20,500
Middletown	Raw water, Highland supply	10/ 4/12													250
Middletown	Filtered water, Monhagen supply	11/ 9/12	Trace	Clear	56	38	.100	.066	.003	0.10	1.75	22.1	14.0	1.80	1,200
Middletown	Raw water, Highland supply	11/ 9/12													700
Middletown	Filtered water, Highland supply	11/ 9/12	8	Clear	48	38	.010	.128	.001	0.04	1.00	31.2	22.0	3.70	210
Middletown	Raw water, Monhagen supply	11/ 9/12													900
Middletown	Filtered water, Monhagen supply	12/30/12	5	Clear	55	37	.422	.100	.001	0.02	1.50	22.1	15.0	1.30	600
Middleville	Tap, public supply	12/30/12													400
Middleville	Tap, public supply	12/30/12													200
Middleville	Tap, public supply	2/16/12	15	Trace	70	49	.032	.140	Trace	0.08	1.75	32.5	18.0	2.80	160
Middleville	Tap, public supply	3/20/12	15	5	153	136	.096	.078	.007	0.68	1.50	128.6	128.0	1.40	1,400
Milford	Tap, public supply	4/25/12	5	5	150	136	.064	.032	.004	0.64	1.25	120.0	119.0	1.90	1,800
Milford	Tap, public supply	9/11/12	25	10	91	77	.034	.130	.003	0.36	0.50	54.3	53.0	17.00	900
Milford	Tap, public supply	10/29/12	10	2	149	127	.014	.110	.001	0.12	1.00	120.0	117.0	2.70	1,100
Millbrook	Tap, public supply	11/30/12	10	10	140	123	.014	.094	.001	0.40	1.50	111.4	106.0	1.80	1,400
Millbrook	Stream (proposed source)	2/ 2/12	10	15	85	50	.016	.052	Trace	0.48	1.25	28.6	26.0	1.90	180
Millbrook	Brook	4/13/12	15	10	34	17	.004	.086	Trace	0.26	0.75	20.8	13.0	2.60	190
Millerton	Spring	11/15/12	15	10	55	41	.010	.080	Trace	0.36	1.00	35.1	21.0	3.20	950
Millerton	Tap, public supply	6/26/12	8	Trace	44	34	.014	.034	.001	0.16	1.62	26.0	25.0	1.00	
Millerton	Tap, public supply	8/ 6/12													
Millerton	Tap, public supply	8/ 6/12													200
Millerton	Tap, public supply	1/20/12	Trace	Clear											170
Millerton	Tap, public supply	2/27/12	8	Clear	131	109	.006	.014	.001	0.28	1.87	114.2	110.0	0.20	80
Mohawk	Tap, public supply	3/29/12	Trace	12	122	106	.010	.050	.001	0.36	1.25	75.7	63.0	1.10	4,900
Mohawk	Tap, public supply	5/21/12	Trace	Clear	119	104	.006	.008	.001	0.70	1.75	98.6	86.0	0.30	90
Mohawk	Tap, public supply	8/30/12	Trace	Clear	129	112	.002	.008	.001	0.30	1.75	111.4	110.0	0.10	30
Mohawk	Tap, public supply	10/18/12	Trace	Clear	237	204	.002	.002	.001	0.52	1.50	142.8	142.0	0.20	40
Monroe	Tap, public supply	12/21/12	Trace	Clear	221	178	.004	.006	Trace	1.00	3.25	174.2	128.0	0.30	60
Monroe	Tap, public supply	2/ 3/12	Trace	Clear	141	121	.014	.034	.001	0.70	1.75	111.4	108.0	1.20	200
Monroe	Tap, public supply	4/20/12	Trace	Clear	275	254	.020	.016	.001	0.34	3.50	162.5	148.0	0.10	10
Monroe	Tap, public supply	6/20/12	2		233	218	.006	.022	.001	0.48	3.25	148.6	147.0	0.10	4
Monroe	Tap, public supply	9/12/12	2		210	179	.004	.004	.001	0.64	3.50	168.6	142.0	0.13	215
Monroe	Tap, public supply	11/30/12	Trace	Clear	195	180	.008	.018	Trace	0.34	3.50	165.8	146.0	1.60	23
	Tap, public supply	1/25/12	15	Clear	51	34	.032	.124	.001	0.14	2.25	19.5	10.0	3.60	30
	Tap, public supply	2/29/12	5	Trace	44	32	.008	.102	Trace	0.14	1.75	20.8	8.0	3.20	70
	Tap, public supply	4/ 3/12	15	Clear	35	23	.008	.100	Trace	0.04	0.75	15.6	8.0	2.90	150
	Tap, public supply	10/ 4/12	15	Clear	47	28	.010	.068	.001	0.10	1.00	15.6	8.0	2.80	120
	Tap, public supply	11/ 8/12	20		44	27	.010	.120	.001	0.20	1.50	19.5	7.0	3.70	38,000
	Tap, public supply	12/28/12	15	Clear 2	46	26	.012	.104	.001	0.14	2.00	15.6	6.0	3.00	140

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Montgomery	Tap, public supply	2/29/12	Trace	Clear	177	159	.014	.028	.001	0.52	3.50	117.2	115.0	0.30	60	+	—	—	..
Montgomery	Tap, public supply	4/ 5/12	Trace	Clear	203	178	.008	.006	Trace	0.48	3.50	128.6	118.0	0.30	30	—	—	—	..
Montgomery	Tap, public supply	10/ 4/12	5	Clear	191	155	.002	.010	.001	0.18	3.50	140.0	119.0	0.60	950	+	+	—	..
Montgomery	Tap, public supply	11/ 9/12	Trace	Clear	187	165	.010	.036	.001	0.50	4.25	140.0	123.0	1.10	90	—	—	—	..
Montgomery	Tap, public supply	12/28/12	Trace	Clear	195	165	.030	.036	Trace	0.46	4.50	125.8	121.0	0.20	60	+	—	—	..
Monticello	Tap, public supply	1/27/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	450	—	—	—	..
Monticello	Tap, public supply	4/ 5/12	10	Trace	35	25	.008	.086	Trace	0.02	2.00	11.1	2.0	2.30	80	+	+	—	..
Monticello	Tap, public supply	10/ 9/12	5	Trace	39	30	.004	.072	Trace	0.06	1.75	7.9	5.0	1.80	1,300	—	—	—	..
Montour Falls	Tap, public supply	1/10/12	5	Trace	125	96	.034	.034	.006	0.90	3.25	64.3	63.0	1.10	100	+	—	—	..
Montour Falls	Tap, public supply	2/13/12	20	5	137	112	.056	.056	.008	0.80	3.75	87.1	80.0	1.35	200	+	—	—	..
Montour Falls	Tap, public supply	3/21/12	35	100	95	72	.014	.200	.002	0.50	1.50	58.6	21.0	9.20	1,900	+	+	—	..
Montour Falls	Tap, public supply	4/24/12	15	5	91	78	.006	.070	.001	1.20	2.00	61.4	40.0	2.20	2,000	+	—	—	..
Montour Falls	Tap, public supply	10/ 8/12	10	Clear	95	81	.004	.052	.001	0.38	1.25	64.3	60.0	2.10	47,500	+	+	—	..
Montour Falls	Tap, public supply	11/27/12	15	Clear	148	122	.028	.070	.001	0.34	1.50	87.1	77.0	1.90	2,000	+	+	—	..
Moravia	Tap, public supply	1/13/12	Trace	Clear	97	64	.012	.072	Trace	2.40	2.00	48.6	39.0	0.40	40	+	—	—	..
Moravia	Tap, public supply	2/12/12	Trace	Clear	87	71	.012	.024	.001	2.40	2.50	48.6	46.0	1.10	.....	...	...	...	..
Moravia	Tap, public supply	3/20/12	5	Clear	156	132	.006	.036	.001	2.80	2.37	54.6	36.0	0.60	3,300	—	—	—	..

Mt. Morris	Silver Lake, public supply	5/17/12	8	2	142	105	.060	.216	.001	0.14	3.00	77.1	70.0	3.70	500
Mt. Morris	Tap, public supply	10/ 2/12	5	5	280	240	.004	.004	.004	2.40	6.25	228.5	175.0	1.60	1,000
Mt. Morris	Fountain, public supply	11/25/12	Trace	Clear	262	219	.012	.042	Trace	3.60	6.75	208.0	108.0	0.40	3,000
Mt. Upton	Tap, public supply	1/31/12	Trace	Clear	54	26	.010	.010	.001	0.30	6.75	24.7	24.0	0.20	20
Mt. Upton	Tap, public supply	3/ 8/12	Trace	Clear	44	37	.008	.018	.001	0.26	0.50	24.7	21.0	0.30	20
Mt. Upton	Tap, public supply	4/10/12	Trace	Clear	43	25	.004	.014	Trace	0.20	0.62	19.5	14.0	0.20	80
Mt. Upton	Tap, public supply	10/14/12	Trace	Clear	65	54	.004	.014	Trace	0.40	1.00	39.0	26.0	0.80	
Mt. Vernon	Raw Mamaroneck river water	11/15/12	Trace	Clear	33	26	.020	.020	.002	0.26	1.00	26.0	20.0	0.50	30
Mt. Vernon	Filtered Mamaroneck river water	12/ 7/12	5	2	40	27	.008	.022	Trace	0.36	1.00	22.1	18.0	1.00	70
Mt. Vernon	Raw water, Pelham plant	1/18/12													
Mt. Vernon	Filtered water, Pelham plant	1/18/12	15	Clear	110	89	.056	.046	Trace	0.78	6.50	44.3	23.0	0.80	
Mt. Vernon	Raw Mamaroneck river water	1/20/12													
Mt. Vernon	Filtered Mamaroneck river water	1/20/12	8	Clear	164	124	.012	.060	.002	2.00	9.00	67.6	49.0	1.70	2,400
Mt. Vernon	Tom Paine brook, Pelham plant	2/21/12	35	5	90	60	.126	.108	.007	0.72	6.75	41.6	30.0	4.80	20
Mt. Vernon	Filtered water, Pelham plant	2/21/12	5	5	95	74	.156	.096	.003	0.72	8.75	39.0	18.0	2.90	3,500
Mt. Vernon	Tap, 157 South Railroad avenue	2/22/12													140
Mt. Vernon	Tap, 210 Tecumseh avenue	2/22/12													28,000
Mt. Vernon	Tap, 46 Clarmont place	2/24/12	15	Clear	138	109	.040	.072	.003	2.00	8.50	77.1	48.0	2.90	30
Mt. Vernon	Tap, 3 Stevens avenue	2/24/12													750
Mt. Vernon	Raw Mamaroneck river water	2/24/12													1,500
Mt. Vernon	Filtered Mamaroneck river water	2/24/12													12,000
Mt. Vernon	Raw water, Pelham plant	3/29/12	15	3	110	82	.074	.136	.001	1.80	7.00	60.0	20.0	4.10	11,000
Mt. Vernon	Filtered water, Pelham plant	3/29/12	15	5	81	61	.050	.090	.001	0.72	7.25	37.7	18.0	2.30	400
Mt. Vernon	Raw water, Pelham plant	3/29/12	5	Trace	84	68	.052	.062	.002	0.70	7.25	35.1	8.0	0.90	8,500
Mt. Vernon	Filtered water, Pelham plant	3/29/12													14,500
Mt. Vernon	Raw Mamaroneck river water	5/ 4/12	20	Clear	124	77	.014	.068	Trace	2.00	7.75	70.0	34.0	2.30	2,700
Mt. Vernon	Filtered Mamaroneck river water	5/ 4/12													5,200
Mt. Vernon	Pump house at Pelham reservoir	5/ 4/12													1,100
Mt. Vernon	Tap, 502 West Lincoln avenue	5/ 4/12	5	Trace	140	113	.006	.062	Trace	1.02	7.25	67.1	42.0	1.50	1,000
Mt. Vernon	Tap, 194 South Columbus avenue	7/19/12	15	3	96	74	.012	.096	.002	0.34	4.75	37.7	32.0	2.40	80
Mt. Vernon	Raw Mamaroneck river water	7/19/12	Trace	Clear	80	59	.010	.044	Trace	0.34	5.25	42.9	21.0	0.80	1,400
Mt. Vernon	Filtered water	7/19/12													30
Mt. Vernon	Raw water, Pelham plant	8/28/12													3,100
Mt. Vernon	Filtered water, Pelham plant	8/28/12	7	Clear	168	153	.010	.042	.003	1.20	14.25	101.5	85.0	2.20	49,500
Mt. Vernon	Raw Mamaroneck river water	8/29/12	32	5	138	117	.002	.284	.001	0.02	8.12	68.6	55.0	6.10	350
Mt. Vernon	Filtered water	8/29/12	8	Clear	140	120	.002	.098	.001	0.02	8.12	67.8	42.0	2.50	170
Mt. Vernon	Raw water, Pelham plant	10/17/12	Trace	Clear	255	224	.004	.032	Trace	1.60	19.00	120.0	91.0	1.00	16,000
Mt. Vernon	Filtered water, Pelham plant	10/17/12	20	10	110	92	.002	.200	Trace	0.10	6.87	72.9	65.0	5.00	400
Mt. Vernon	Raw Mamaroneck river water	10/22/12	20	1	108	84	.002	.198	Trace	0.06	6.87	52.9	46.0	3.50	1,300
Mt. Vernon	Filtered water, public supply	10/22/12													200
Mt. Vernon	Raw water, Pelham plant	12/18/12	5	Clear	262	252	.006	.060	Trace	1.50	27.00	162.5	119.0	0.90	300
Mt. Vernon	Filtered water, Pelham plant	12/18/12	15	Trace	115	73	.028	.072	.003	0.70	7.25	54.3	35.0	2.20	30
Mt. Vernon	[illegible]	12/21/12	5	Clear			.028	.050	.001	0.70	7.25	54.3	24.0	0.80	270,000
Mt. Vernon	[illegible]	12/21/12													600
Napanoch	Tap in power house, Eastern New York Reformatory	2/22/12	5	Clear	106	85	.018	.028	.001	0.70	7.50	58.6	26.0	1.40	50
Napanoch	Tap in mess hall, Eastern New York Reformatory	2/22/12	Trace	Clear	43	26	.006	.018	Trace	0.02	1.00	9.5	4.0	0.90	45

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Napanoch	Reservoir, Eastern New York Reformatory	3/30/12	15	Trace	24	16	.012	.036	Trace	0.04	0.50	11.1	4.0	2.40	700	+	—	—	..
Napanoch	Tap, Eastern New York Reformatory	6/20/12	Trace	Clear	17	13	.008	.028	.002	Trace	1.00	6.3	4.0	1.34	170	+	—	—	..
Napanoch	Tap, Eastern New York Reformatory	8/7/12	7	Clear	35	30	.016	.064	Trace	0.02	1.00	11.1	10.0	1.60	100	+	—	—	..
Napanoch	Tap, Eastern New York Reformatory	8/16/12	....	....	....	....	....	....	....	....	....	....	....	....	6,600	+	+	+	..
Napanoch	Tap, Eastern New York Reformatory	9/3/12	Trace	Clear	47	26	.010	.028	.001	0.02	0.75	12.7	11.0	1.20	50	+	+	—	..
Napanoch	Tap, Eastern New York Reformatory	10/17/12	10	Clear	30	22	.004	.026	.001	0.02	0.75	20.8	9.0	1.10	200	+	—	—	..
Napanoch	Tap, Eastern New York Reformatory	11/15/12	5	Trace	17	13	.014	.036	Trace	0.04	1.50	9.5	1.0	0.50	1,200	—	—	—	..
Naples	Tap, public supply	6/1/12	12	10	160	138	.008	.084	Trace	0.24	1.00	120.0	115.0	2.70	16,000	+	+	+	..
Nassau	Tap, public supply	2/1/12	Trace	Trace	139	101	.012	.014	.001	0.16	1.25	74.3	72.0	0.40	60	+	—	—	..
Nassau	Tap, public supply	3/16/12	Trace	Trace	97	77	.004	.016	Trace	0.14	1.62	67.1	61.0	1.10	1,400	+	—	—	..
Nassau	Tap, public supply	4/17/12	20	15	110	79	.012	.082	Trace	0.08	1.25	45.7	38.0	2.50	200	+	—	—	..
Nassau	Tap, public supply	7/16/12	55	12	121	90	.038	.250	.001	0.10	0.25	64.3	63.0	7.00	....	..	..	..	..
Nassau	Tap, public supply	7/25/12	....	....	....	....	....	....	....	....	....	....	....	....	1,000	—	—	—	..
Nassau	Tap, public supply	10/28/12	3	3	109	95	.008	.068	.001	0.20	1.00	62.9	48.0	1.40	350	+	+	—	..
Nassau	Overflow from power canal, public supply	11/30/12	....	....	....	....	....	....	....	....	....	....	....	....	500	+	+	—	..
[illegible]	[illegible] supply	11/20/12	Trace	Trace	105	94	.003	.064	Trace	0.22	0.75	74.3	64.0	0.70	130	+	—	—	..
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	475	+	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (−=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Newport	Tap, public supply	2/15/12	Trace	Clear	157	131	.016	.022	Trace	0.60	0.50	122.8	120.0	0.10	15	+	−	−	..
Newport	Tap, public supply	3/20/12	Trace	Clear	152	130	.008	.004	Trace	0.60	0.25	125.8	120.0	0.40	70	+	−	−	..
Newport	Tap, public supply	4/23/12	Trace	Clear	146	133	.006	.008	.001	0.48	0.75	122.8	118.0	0.30	950	−	−	−	..
Newport	Tap, public supply	9/11/12	Trace	Clear	248	217	.006	.006	Trace	1.36	1.00	208.0	192.0	0.20	325	+	+	−	..
Newport	Tap, public supply	10/29/12	Trace	Clear	256	242	.012	.032	.001	1.00	1.00	243.0	207.0	0.80	50	+	−	−	..
Newport	Tap, public supply	12/11/12	None	Clear	246	230	.012	.016	Trace	0.70	1.25	218.0	202.0	1.10	110	−	−	−	..
New Rochelle	Tap, public supply	1/20/12	10	5	110	74	.040	.130	.003	0.16	5.75	45.7	10.0	2.90	80	+	−	−	..
New Rochelle	Tap, public supply	2/22/12	20	Trace	76	44	.016	.098	.001	0.52	6.00	33.8	22.0	3.90	70	−	−	−	..
New Rochelle	Tap, public supply	3/29/12	25	5	66	34	.034	.134	.001	0.48	4.50	27.3	11.0	3.70	750	+	−	−	..
New Rochelle	Tap, public supply	5/ 4/12	10	3	70	49	.010	.108	.002	0.40	4.50	29.9	12.0	2.70	200	+	−	−	..
New Rochelle	Tap, public supply	8/30/12	18	1	85	67	.018	.130	.001	0.12	4.75	35.1	25.0	2.60	550	+	−	−	..
New Rochelle	Tap, public supply	10/22/12	....	....	....	....	....	....	....	....	....	....	....	....	5,300	+	−	−	..
New Rochelle	Tap, public supply	11/27/12	20	Trace	110	79	.004	.172	Trace	0.04	6.25	55.7	42.0	3.10	600	−	−	−	..
New Rochelle	Tap, public supply	12/21/12	35	10	78	46	.022	.152	.001	0.20	5.75	39.0	17.0	5.00	2,000	+	−	−	..
New York city	Tap, House of Refuge, Randall's Island	3/ 7/12	30	5	60	33	.040	.150	.001	0.34	3.50	32.5	28.0	4.80	190	−	−	−	.
New York city	Tap, House of Refuge, Randall's Island	3/26/12	35	50	82	60	.080	.208	.001	0.14	3.00	31.2	20.0	6.00	900	−	−	−	..
New York city	Tap, Manhattan State Hospital, Ward's Island	5/ 7/12	20	5	73	41	.028	.132	.002	0.24	2.75	31.2	26.0	4.10	400	−	−	−	..
New York city	Tap, House of Refuge, Randall's Island	4/30/12	20	Trace	61	44	.032	.112	.001	0.24	2.75	33.8	15.0	3.70	500	+	−	−	..
New York city	Tap, House of Refuge, Randall's Island	5/24/12	17	2	86	64	.014	.120	.003	0.16	3.00	32.5	29.0	3.90	60	+	[illegible]	[illegible]	[illegible]
New York city	Tap, House of Refuge, Randall's Island	6/28/12	17	5	90	63	.006	.112	.001	0.14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
New York city	Tap, House of Refuge, Randall's Island	7/31/12	17	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Niagara Falls	Raw water, Western N. Y. Water Co.	8/ 1/12	Trace	2	146	124	.032	.062	001	0.06	7.25	95.7	90.0	1.70	25,000	+	+	+
Niagara Falls	Filtered water, Western N. Y. Water Co.	8/ 1/12	Trace	Clear	130	112	.032	.026	Trace	0.06	7.25	91.4	74.0	0.70	40	—	—	—
Niagara Falls	Raw water, municipal supply	8/ 1/12	Trace	2	150	129	.004	.056	001	0.06	7.00	91.4	90.0	1.60	1,800	+	+	+
Niagara Falls	Filtered water, Second and Falls streets	8/ 1/12	Trace	Clear	159	132	.004	.022	Trace	0.06	7.00	91.4	71.0	0.70	60	+	+	—
Niagara Falls	Raw water, Western N. Y. Water Co.	9/19/12	3	1	163	121	.034	.078	.004	0.02	8.25	107.2	91.0	1.80	22,500	+	+	+
Niagara Falls	Filtered water, Western N. Y. Water Co.	9/19/12	Trace	Clear	170	130	.026	.038	.001	0.04	8.37	102.8	83.0	1.00	20	—	—	—
Niagara Falls	Raw water, municipal supply	9/19/12	5	1	148	118	.008	.060	.002	0.04	7.25	94.3	90.0	1.20	16,500	+	+	+
Niagara Falls	Filtered water, municipal supply	9/19/12	Trace	Clear	159	119	.012	.054	.001	0.04	9.12	88.6	80.0	0.90	55	+	—	—
Niagara Falls	Tap, municipal supply	12/10/12	Trace	Clear	145	126	.014	.074	.001	0.06	7.87	97.1	84.0	0.40	......	......	......	......
North Pelham	Tap, public supply	12/21/12	10	Trace	105	78	.020	.114	.001	0.10	6.75	62.9	44.0	3.60	410,000	—	—	—
North Tonawanda	Tap, public supply	1/24/12	5	15	160	131	.016	.058	.002	0.08	7.75	105.8	98.0	1.76	125	+	+	—
North Tonawanda	Tap, public supply	3/ 8/12	10	5	131	110	.016	.069	Trace	0.10	7.00	105.8	98.0	0.80	120	+	—	—
North Tonawanda	Tap, public supply	4/20/12	10	10	141	130	.008	.032	.002	0.08	6.75	104.2	92.0	1.10	15,000	+	+	—
North Tonawanda	Tap, public supply	8/15/12	5	Clear	153	119	.008	.054	.001	0.08	7.75	94.3	94.0	2.00	......	......	......	......
North Tonawanda	Tap, public supply	9/19/12	5	Clear	154	124	.002	.064	.002	0.04	6.75	97.2	88.0	1.70	11,500	+	+	+
North Tonawanda	Tap, public supply	11/22/12	10	25	174	152	.016	.100	Trace	0.06	8.00	102.8	95.0	2.20	2,000	+	—	—
Northville	Tap, public supply	4/ 6/12	15	Clear	28	17	.008	.050	Trace	0.10	0.25	7.9	5.0	3.30	100	+	—	—
Norwich	Tap, public supply	1/ 4/12	5	Trace	52	43	.026	.060	Trace	0.60	1.75	27.3	17.0	1.40	100	+	+	—
Norwich	Tap, public supply	2/17/12	10	Clear	50	38	.018	.072	Trace	0.26	1.50	35.1	25.0	2.10	1,050	+	—	—
Norwich	Tap, public supply	3/28/12	Trace	Clear	44	29	.016	.036	Trace	0.48	1.75	19.5	7.0	1.20	40	+	—	—
Norwich	Tap, public supply	5/ 2/12	Trace	Clear	53	38	.002	.056	Trace	0.40	0.75	19.5	9.0	0.20	25	+	—	—
Norwich	Tap, public supply	9/13/12	15	Trace	75	60	.008	.076	Trace	0.08	0.75	40.3	31.0	2.70	3,100	+	—	—
Norwich	Tap, public supply	10/23/12	5	Clear	57	45	.016	.094	Trace	0.26	0.75	33.8	31.0	2.40	300	—	—	—
Norwich	Tap, public supply	12/ 4/12	10	Clear	46	35	.004	.074	Trace	0.40	0.75	31.2	20.0	2.40	475	+	+	—
Norwood	Tap, public supply	1/ 8/12	40	5	35	17	.020	.092	Trace	0.10	0.75	12.7	8.0	10.40	160	+	+	—
Norwood	Tap, public supply	1/12/12	50	1	57	30	.012	.106	.001	0.10	0.37	15.6	6.0	13.60	450	+	+	+
Norwood	Tap, near Whitney House	1/12/12	......	......	......	......	......	......	......	......	......	......	......	......	210	+	+	—
Norwood	Tap, railroad station	1/12/12	......	......	......	......	......	......	......	......	......	......	......	......	230	+	+	—
Norwood	Tap, public supply	2/12/12	45	Trace	86	46	.020	.110	Trace	0.20	0.37	16.9	11.0	29.04	......	......	......	......
Norwood	Tap, public supply	3/15/12	40	Clear	73	40	.028	.102	.003	0.10	0.75	24.7	12.0	22.00	400	+	+	+
Norwood	Tap, public supply	4/19/12	......	......	......	......	......	......	......	......	......	......	......	......	1,100	+	+	+
Norwood	Tap, public supply	9/ 7/12	70	2	110	72	.004	.138	.001	0.08	0.62	33.8	17.0	21.60	240	+	+	—
Norwood	Tap, public supply	10/25/12	55	10	81	36	.024	.190	Trace	0.08	0.50	24.7	10.0	24.40	800	+	+	+
Norwood	Tap, public supply	12/ 6/12	55	5	60	25	.020	.132	.001	0.06	0.75	20.8	15.0	17.20	1,800	+	+	+
Nunda	Tap, public supply	2/21/12	10	20	158	137	.012	.056	Trace	0.90	1.50	117.2	116.0	1.70	6,200	+	+	—
Nunda	Tap, public supply	4/ 1/12	10	30	156	136	.016	.062	.001	1.08	1.50	111.4	96.0	2.40	23,000	+	+	—
Nunda	Tap, public supply	10/ 2/12	Trace	Clear	218	186	.004	.008	.001	0.60	2.50	160.0	145.0	0.90	6,000	+	—	—
Nunda	Tap, public supply	11/25/12	Trace	Clear	182	167	.008	.022	Trace	0.80	3.00	157.2	145.0	0.70	500	—	—	—
Nyack	Raw Hackensack river water	1/24/12	25	Trace	90	71	.034	.098	.003	0.36	4.12	45.7	37.0	3.64	1,700	+	+	—
Nyack	Filtered water	1/24/12	15	Trace	91	73	.048	.098	.002	0.48	4.50	48.6	38.0	2.84	950	+	+	—
Nyack	Tap, municipal spring supply	1/24/12	10	Trace	127	111	.024	.066	.003	0.80	3.50	71.4	66.0	2.15	450	+	—	—
Nyack	Tap, Odell supply	1/24/12	Trace	Clear	191	177	.012	.010	.001	1.60	6.75	131.4	127.0	0.20	20	—	—	—
Nyack	Raw Hackensack river water	2/28/12	......	......	......	......	......	......	......	......	......	......	......	......	35,000	+	+	+
Nyack	Filtered water	2/28/12	15	15	65	46	.036	.140	.001	0.34	3.00	32.5	23.0	4.40	11,500	+	+	+
Nyack	Tap, municipal spring supply	2/28/12	10	8	104	83	.008	.062	.001	0.90	5.50	67.1	61.0	2.50	5,000	+	+	+
Nyack	Tap, Odell supply	2/28/12	Trace	Clear	176	151	.020	.042	Trace	1.20	5.62	105.8	103.0	1.10	3,800	+	+	+
Nyack	Raw Hackensack river water	4/ 2/12	......	......	......	......	......	......	......	......	......	......	......	......	500	+	—	—
Nyack	Filtered water	4/ 2/12	15	Trace	49	41	.004	.046	Trace	0.08	3.25	33.8	30.0	2.90	200	+	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Nyack	Tap, municipal spring supply	4/ 3/12	15	Trace	109	99	.006	.062	Trace	0.72	5.50	67.1	66.0	2.30	40	—	—	—	..
Nyack	Tap, Odell supply	4/ 2/12	Trace	Clear	176	164	.004	.008	Trace	2.00	6.50	137.2	128.0	0.30	20	+	—	—	..
Nyack	Raw Hackensack river water	10/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	800	+	+	—	..
Nyack	Filtered water	10/ 2/12	10	Clear	104	74	.008	.052	Trace	0.26	3.75	60.0	53.0	2.40	450	+	+	—	..
Nyack	Tap, municipal spring supply	10/ 2/12	12	Clear	139	101	.004	.038	.001	0.70	5.75	80.0	75.0	2.00	130	+	—	—	..
Nyack	Tap, Odell supply	10/ 2/12	Trace	Clear	210	168	.002	.008	.001	1.20	6.50	128.6	123.0	0.30	60	+	—	—	..
Nyack	Raw Hackensack river water	11/ 8/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,200	+	+	—	..
Nyack	Filtered water	11/ 8/12	25	Trace	108	80	.006	.100	Trace	0.20	5.25	54.3	39.0	5.30	11,000	+	+	—	..
Nyack	Tap, municipal spring supply	11/ 9/12	22	Trace	133	100	.016	.098	Trace	0.60	5.75	72.9	57.0	4.90	.....	+	—	—	..
Nyack	Tap, Odell supply	11/ 9/12	Trace	Clear	192	170	.014	.024	Trace	1.80	6.25	128.6	125.0	0.50	.....	+	—	—	..
Nyack	Raw Hackensack river water	12/ 7/12	25	5	94	70	.024	.138	Trace	0.20	4.75	45.7	28.0	6.30	28,000	+	+	+	..
Nyack	Filtered water	12/ 7/12	20	Clear	109	89	.014	.108	Trace	0.60	6.00	58.6	42.0	4.80	1,300	+	+	—	..
N[illegible]		[illegible] 7/12	Trace	Clear	223	190	.010	.026	Trace	2.40	12.50	137.2	112.0	0.80	10	+	—	—	..
													.....	.....	70	—	—	—	..

Ogdensburg	St. Lawrence river, temporary intake, flume	5/ 9/12	65	Trace	83	44	.018	.206	.001	0.04	1.00	33.8	30.0	5.70					
Ogdensburg	Tap, Group "3," St. Lawrence State Hospital	5/13/12													5,000	+	—	—	
Ogdensburg	Tap, Garden cottage	5/13/12													4,600	+	+	—	
Ogdensburg	Tap, Ward "F"	5/13/12	86	5	89	68	.018	.150	.001	0.08	2.50	41.6	32.0	12.80					
Ogdensburg	Oswegatchie river, at intake racks	5/20/12													400	+	+	—	
Ogdensburg	Suction well, Lang pumps, Oswegatchie river	5/20/12													350	+	+	—	
Ogdensburg	St. Lawrence river, over intake, new supply	5/20/12	8	Trace	130	109	.004	.142	.001	0.10	7.50	91.4	90.0	2.60	40	+	—	—	
Ogdensburg	Oswegatchie river, intake flume	5/20/12	80	5	71	51	.022	.166	.001	0.06	1.00	31.2	31.0	14.80					
Ogdensburg	Oswegatchie river, in front of intake racks	6/ 5/12													750	+	+	+	
Ogdensburg	St. Lawrence river, over intake, new supply	6/ 5/12	5	2	129	103	.006	.064	.001	0.10	7.00	87.1	87.0	2.70	70	+	—	—	
Ogdensburg	Oswegatchie river, in front of intake racks	6/ 5/12													1,200	+	+	+	
Ogdensburg	Suction well, Lang pumps, Oswegatchie river	6/ 5/12													1,100	+	+	+	
Ogdensburg	Temporary flume at pumping station	6/ 5/12	80	15	56	35	.022	.230	.001	0.04	0.50	33.8	28.0	15.60					
Ogdensburg	Oswegatchie river, in front of intake racks at pumping station	6/17/12													700	+	+	+	
Ogdensburg	Temporary intake flume at pumping station on Oswegatchie river	6/17/12	60	10	111	78	.018	.222	Trace	0.06	1.00	41.6	39.0	14.80					
Ogdensburg	St. Lawrence river, point near intake of new supply	6/17/12	Trace	2	107	96	.008	.062	.001	0.08	7.00	95.7	92.0	2.70	160	+	—	—	
Ogdensburg	Suction well of Snow pump at pumping station	6/17/12													20	—	—	—	
Ogdensburg	Clear water well, effluents of all filters, new supply	6/17/12													4,400	—	—	—	
Ogdensburg	Oswegatchie river, at diverting gates of old temporary flumes	6/25/12	70	15	73	52	.023	.202	.001	0.08	0.75	36.4	35.0	13.20					
Ogdensburg	Tap in pumping station on Oswegatchie river	6/25/12													375	—	—	—	
Ogdensburg	Oswegatchie river, in front of intake racks	6/25/12													1,100	+	+	—	
Ogdensburg	Clear water well, effluent of filter unit No. 1	6/25/12													110	+	—	—	
Ogdensburg	Clear water well, effluent of filter unit No. 2	6/25/12													100	—	—	—	
Ogdensburg	Clear water well, effluent of filter unit No. 3	6/25/12													160	—	—	—	
Ogdensburg	Clear water well, effluent of filter unit No. 4	6/25/12													30	+	—	—	
Ogdensburg	Clear water well, effluents of all filters	6/25/12													30	+	—	—	
Ogdensburg	St. Lawrence river, at point over intake of new supply	6/25/12	5	1	154	127	.008	.058	.001	0.14	7.50	91.4	91.0	2.60	30	—	—	—	

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Ogdensburg	Oswegatchie river, in front of old intake rack	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	800	+	+	—	..
Ogdensburg	Oswegatchie river, at diverting gates of old temporary flumes	7/ 2/12	65	5	90	66	.020	.138	.002	0.08	0.50	32.5	29.0	14.80	.....	.....	.....	.....	..
Ogdensburg	Tap, in pumping station on Oswegatchie river	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160	+	—	—	..
Ogdensburg	Clear water well, of filter No. 1	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	—	—	—	..
Ogdensburg	Clear water well, of filter No. 2	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	—	—	—	..
Ogdensburg	Clear water well, of filter No. 3	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80	+	—	—	..
Ogdensburg	Clear water well, of filter No. 4	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	+	—	—	..
Ogdensburg	Clear water well, of all filters	7/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50	—	—	—	..
Ogdensburg	St. Lawrence river, at point over intake of new supply	7/ 2/12	Trace	Clear	170	150	.008	.052	.001	0.08	7.75	94.3	94.0	2.60	30	+	—	—	..

Ogdensburg	Clear water well, filter unit No. 3	7/18/12													6,500	+	+	—	
Ogdensburg	Clear water well, filter unit No. 4	7/18/12													16,500	+	—	—	
Ogdensburg	St. Lawrence river, new supply	7/31/12	Trace	Clear	122	102	.018	.066	.001	0.08	2.37	92.9	91.0	0.60	270	+	—	—	
Ogdensburg	Tap, St. Lawrence, at pump house	7/31/12													450	+	+	—	
Ogdensburg	Oswegatchie river, above pump station	7/31/12	80	5	113	82	.030	.122	.001	0.06	1.50	33.8	25.0	18.00	14,000	+	+	+	
Ogdensburg	Tap in pumping station on Oswegatchie river	7/31/12													1,400	+	—	—	
Ogdensburg	Clear water well, filter unit No. 1	7/31/12													12,000	+	—	—	
Ogdensburg	Clear water well, filter unit No. 2	7/31/12													250	+	+	—	
Ogdensburg	Clear water well, filter unit No. 3	7/31/12													3,700	+	+	—	
Ogdensburg	Clear water well, filter unit No. 4	7/31/12													150	+	—	—	
Ogdensburg	Composite clear water wells	7/31/12													9,200	+	—	—	
Ogdensburg	St. Lawrence river at intake, new supply	8/14/12	Trace	Clear	131	110	.008	.052	.001	0.08	7.37	97.1	94.0	2.10	100	+	—	—	
Ogdensburg	Raw St. Lawrence river water	8/14/12													100	—	—	—	
Ogdensburg	Clear water well, filter unit No. 1	8/14/12													50	—	—	—	
Ogdensburg	Clear water well, filter unit No. 2	8/14/12													30	—	—	—	
Ogdensburg	Clear water well, filter unit No. 3	8/14/12													750	+	—	—	
Ogdensburg	Clear water well, filter unit No. 4	8/14/12													475	+	—	—	
Ogdensburg	Composite of all filter units	8/14/12													80	+	—	—	
Ogdensburg	Oswegatchie river above pumping station	8/14/12	60	8	60	40	.012	.156	.001	0.06	1.00	31.2	26.0	17.00	200	+	+	..	
Ogdensburg	Tap, filtered St. Lawrence river water	8/14/12													180	—	—	—	
Ogdensburg	St. Lawrence river at intake, new supply	8/27/12	6	Trace	169	138	.020	.076	.001	0.06	8.00	102.8	93.0	2.00	275	+	—	—	
Ogdensburg	Tap in pumping station on St. Lawrence river	8/27/12													110	—	—	—	
Ogdensburg	Oswegatchie river, above pumping station	8/27/12	55	10	100	80	.010	.184	.001	0.16	0.25	36.4	34.0	15.40	1,500	+	+	+	
Ogdensburg	Tap in pumping station on Oswegatchie river	8/27/12													180	—	—	—	
Ogdensburg	Clear water well, filter unit No. 1	8/27/12													3,300	—	—	—	
Ogdensburg	Clear water well, filter unit No. 2	8/27/12													250	—	—	—	
Ogdensburg	Clear water well, filter unit No. 3	8/27/12													30	+	—	—	
Ogdensburg	Clear water well, filter unit No. 4	8/27/12													160	—	—	—	
Ogdensburg	Composite of all filters	8/27/12													300	—	—	—	
Ogdensburg	St. Lawrence river, over intake	9/26/12	Trace	Clear	143	121	.008	.108	.004	0.06	7.50	94.3	93.0	2.00	130	+	+	—	
Ogdensburg	Oswegatchie river in front of old intake racks	9/26/12	70	5	95	49	.008	.144	Trace	0.08	0.75	29.9	25.0	18.20	2,400	+	+	—	
Ogdensburg	Tap in pumping station, Oswegatchie river	9/26/12													210	—	—	—	
Ogdensburg	Clear water well, filter unit No. 1	9/26/12													200	+	—	—	
Ogdensburg	Clear water well, filter unit No. 2	9/26/12													200	—	—	—	
Ogdensburg	Clear water well, filter unit No. 3	9/26/12													450	—	—	—	
Ogdensburg	Clear water well, filter unit No. 4	9/26/12													160	+	—	—	
Olean	Tap, public supply	1/22/12	Trace	Clear	214	193	.016	.032	.002	0.40	12.50	177.2	156.0	1.20	850	+	—	—	
Olean	Tap, public supply	2/24/12													30	—	—	—	
Olean	Tap, public supply	2/26/12	Trace	Clear	178	166	.020	.030	.003	0.52	12.87	151.4	149.0	0.50	50	—	—	—	
Olean	Tap, public supply	4/12/12	10	3	176	145	.010	.050	.001	0.26	13.00	134.2	128.0	0.70	70	—	—	—	
Olean	Tap, public supply	7/24/12	8	7	217	193	.004	.028	.001	0.52	13.12	154.2	153.0	0.60	20	+	—	—	

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (−=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
n	Tap, public supply	9/26/12	.....	.....	.....	.....	.....	.....	.003	.....	12.75	155.2	153.0	.....	500	−	−	−	..
n	Tap, public supply	11/14/12	5	Trace	211	198	.012	.058	.001	0.50	12.50	151.4	.....	1.00	2,200	−	−	−	..
n	Tap, public supply	12/16/12	Trace	Clear	217	195	.010	.028	.003	0.50	12.1	171.4	153.0	0.90	6,100	−	−	−	..
da	Tap, public supply	1/23/12	10	15	1,022	968	.104	.076	.010	0.48	17.0	600.0	188.0	2.80	425	+	+	−	..
da	Tap, public supply	2/ 6/12	5	50	1,175	973	.078	.076	.004	0.68	17.7	571.0	198.0	1.90	1,600	+	+	−	..
da	Tap, public supply	3/18/12	10	25	861	750	.038	.054	.002	0.80	12.5	529.0	167.0	2.60	15,000	+	−	−	..
da	Tap, public supply	4/27/12	5	10	619	528	.002	.074	.001	0.72	4.7	364.5	146.0	2.00	600	+	+	−	..
da	Tap, public supply	9/24/12	15	5	974	894	.004	.092	.001	0.04	11.26	800.0	162.0	3.80	13,000	+	−	−	..
da	Tap, public supply	10/29/12	20	25	987	885	.012	.280	Trace	0.04	13.62	629.0	180.0	4.20	1,500	+	+	−	..
da	Tap, public supply	12/28/12	10	10	962	825	.046	.090	.004	0.50	13.75	586.0	189.0	2.90	4,000	+	−	−	..
da	Raw water	2/ 1/12	12	10	32	15	.032	.080	Trace	0.34	1.25	14.3	12.0	2.00	800	+	+	−	..
nta	Filtered water	2/ 1/12	Trace	Clear	32	24	.360	.048	Trace	0.34	1.25	18.2	8.0	0.90	50	−	−	−	..
nta	Effluent filter unit No. 5	2/ 1/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	190	−	−	−	..
nta		3/ 6/12	10	5	37	22	.010	.068	.001	0.34	1.25	15.6	7.0	2.80	700	+	+	−	..
			Trace	Clear	96	75	.425	.076	Trace	0.34	1.25	15.6	5.0	0.90	40	−	−	−	..
												.....	.....		60	−	−	−	..
												0.5	6.0	2.20	2,100	+	+	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (−=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Oxford	Reservoir, Woman's Relief Corps Home	7/29/12	Trace	Clear	71	60	.002	.004	Trace	0.60	1.75	60.0	53.0	0.10	10,500	+	+	−	..
Oxford	Tap, railroad tank, Woman's Relief Corps Home	7/29/12	Trace	Clear	95	74	.002	.002	Trace	0.80	2.12	78.6	63.0	0.90	....	.....	.....	.....	..
Oxford	Tap in kitchen, Woman's Relief Corps Home	7/29/12	......	......	......	......	......	......	......	......	......	......	......	......	1,750	+	+	−	..
Oxford	Tap in barn, public supply	7/29/12	......	......	......	......	......	......	......	......	......	......	......	......	2,000	+	+	−	..
Oxford	Tap, public supply	9/13/12	Trace	Clear	113	91	.002	.004	Trace	0.80	1.25	64.3	48.0	0.20	10	+	−	−	..
Oxford	Tap in kitchen, Woman's Relief Corps Home	10/17/12	Trace	Trace	58	42	.004	.018	Trace	0.60	1.75	28.6	21.0	0.70	200	+	+	−	..
Oxford	Tap, railroad tank, Woman's Relief Corps Home	10/17/12	Trace	Clear	83	72	.004	.016	.001	0.80	2.00	62.9	45.0	0.40	40	+	−	−	..
Oxford	Tap in kitchen, Woman's Relief Corps Home	12/ 4/12	Trace	Trace	31	22	.012	.024	Trace	0.36	1.00	20.8	14.0	1.10	1,300	+	−	−	..
Oxford	Tap, railroad tank, Woman's Relief Corps Home	12/ 4/12	Trace	Trace	59	47	.014	.030	Trace	0.64	1.25	41.6	33.0	0.60	40	+	+	−	..
Painted Post	Tap, public supply	12/ 5/12	Trace	Clear	50	41	.016	.026	.002	1.20	0.75	36.4	27.0	1.60	3υ	−	−	−	..
Painted Post	Tap, public supply	1/ 9/12	5	5	192	165	.004	.018	.001	0.04	1.00	160.0	145.0	0.40	50	[illegible]	[illegible]	[illegible]	..
Painted Post	Tap, public supply	2/14/12	Trace	Clear	167	152	.010	.024	Trace	0.16	1.50	142.8	143.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Painted Post	Tap, public supply	3/21/12	5	Trace	176	154	.014	.018	Trace	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Painted Post	Tap, public supply	10/ 8/12	5	Trace	172	139	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Palmyra	Tap, public supply	11/26/12	Trace	Clear	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
enix	Tap, public supply	10/11/12	15	20	454	348	.014	.108	.002	0.16	98.00	182.0	84.0	5.20	3,800	+	+	+	..
enix	Tap, public supply	11/29/12	20	5	301	279	.022	.124	.001	0.26	94.00	167.2	99.0	5.10	4,900	+	—	—	..
oefield	Raw water	2/23/12	......	......	......	......	......	......	......	......	......	......	......	......	300	+	+	+	..
oefield	Filtered water	2/23/12	5	Clear	47	31	.044	.084	Trace	0.16	0.75	14.3	5.0	4.40	110	+	—	—	..
ttsburg	Tap, public supply	1/ 5/12	10	Clear	123	115	.024	.070	Trace	0.24	0.87	114.2	107.0	2.10	260	—	—	—	..
ttsburg	Tap, public supply	2/ 8/12	5	Clear	136	118	.012	.038	Trace	0.36	0.50	114.2	113.0	1.20	110	+	—	—	..
ttsburg	Tap, public supply	3/14/12	Trace	Clear	136	126	.020	.030	Trace	0.36	0.75	122.8	112.0	0.90	150	—	—	—	..
ttsburg	Tap, public supply	4/18/12	40	Trace	84	52	.014	.134	Trace	0.08	0.75	44.3	40.0	5.20	1,800	+	+	—	..
ttsburg	Upper reservoir, West brook	7/27/12	33	7	119	99	.006	.070	Trace	0.02	0.50	74.3	74.0	8.30	1,300	+	+	+	..
ttsburg	Tap, public supply	9/ 5/12	18	Clear	140	118	.002	.086	.001	0.10	0.25	102.8	101.0	3.00	120	—	—	—	..
ttsburg	Tap, public supply	10/24/12	20	5	120	108	.008	.150	Trace	0.06	0.50	94.2	92.0	4.00	550	—	—	—	..
ttsburg	Tap, public supply	12/ 5/12	15	Clear	109	91	.020	.084	.001	0.20	0.75	88.6	88.0	3.90	500	+	—	—	..
antville	Tap, public supply	1/19/12	5	Trace	106	85	.026	.014	Trace	0.40	3.50	67.1	66.0	0.20	80	+	—	—	..
[illegible]	Tap, public supply	2/28/12	Trace	Clear	127	106	.008	.020	Trace	0.24	4.62	65.7	65.0	0.20	70	—	—	—	..
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.004	.016	Trace	0.08	3.50	61.4	61.0	0.40	120	+	—	—	..

Port Henry	Tap, Witherbee supply	1/ 5/12	5	5	151	136	.024	.052	.001	0.40	2.50	122.8	123.0	1.50	40	—	—	—	..
Port Henry	Tap, municipal supply	1/ 5/12	10	Clear	84	72	.008	.036	.001	0.40	1.12	54.3	50.0	2.10	210	+	—	—	..
Port Henry	Tap, Witherbee supply	2/ 7/12	5	Clear	161	137	.004	.028	Trace	0.40	2.25	122.8	121.0	1.40	150	+	—	—	..
Port Henry	Tap, municipal supply	2/ 7/12	10	Clear	86	61	.028	.076	Trace	0.50	1.00	50.0	46.0	2.80	425	+	—	—	..
Port Henry	Tap, Witherbee supply	3/13/12	5	5	146	136	.024	.126	.001	0.40	2.50	120.0	112.0	4.60	80	+	—	—	..
Port Henry	Tap, municipal supply	3/13/12	Trace	Clear	70	58	.034	.058	.001	0.48	1.75	51.4	50.0	1.50	120	+	—	—	..
Port Henry	Tap, Witherbee supply	4/16/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	425	+	—	—	..
Port Henry	Tap, municipal supply	4/16/12	20	5	100	85	.006	.070	Trace	0.14	0.75	40.3	38.0	3.10	425	+	—	—	..
Port Henry	Tap, Witherbee supply	9/ 5/12	17	Trace	125	105	.004	.034	.001	0.26	1.50	74.3	72.0	3.20	23,000	+	+	—	..
Port Henry	Tap, municipal supply	9/ 5/12	27	Clear	135	108	.004	.046	Trace	0.24	1.00	55.7	55.0	3.50	2,900	+	+	—	..
Port Henry	Tap, Witherbee supply	10/23/12	20	Clear	77	56	.004	.096	Trace	0.14	1.25	45.7	45.0	3.30	120	+	—	—	..
Port Henry	Tap, municipal supply	10/23/12	15	Trace	67	52	.005	.100	Trace	0.14	1.00	45.7	43.0	3.40	200	+	—	—	..
Port Henry	Tap, Witherbee supply	12/ 3/12	25	Trace	145	73	.005	.100	Trace	0.30	1.00	60.0	57.0	3.90	1,200	+	—	—	..
Port Henry	Tap, municipal supply	12/ 4/12	25	5	100	66	.005	.035	Trace	0.30	1.25	44.3	42.0	4.20	1,300	+	+	—	..
Port Jervis	Tap, public supply	1/26/12	15	Clear	32	17	.024	.074	.002	0.08	2.50	11.1	4.0	3.60	900	+	—	—	..
Port Jervis	Tap, public supply	4/ 4/12	10	Trace	19	13	.010	.036	Trace	0.04	0.50	9.5	4.0	1.50	100	+	—	—	..
Port Jervis	Tap, public supply	10/ 9/12	10	Trace	49	31	.018	.082	Trace	0.10	1.25	19.5	9.0	2.50	275	+	—	—	..
Port Jervis	Tap, public supply	11/13/12	22	2	32	20	.025	.124	.001	0.05	1.00	14.3	4.0	4.10	210	+	—	—	..
Port Jervis	Tap, public supply	12/30/12	15	Trace	27	17	.028	.032	Trace	0.06	1.25	11.1	5.0	2.60	800	—	—	—	..
Port Leyden	Tap, public supply	3/19/12	Trace	Clear	47	29	.008	.016	Trace	1.05	0.75	15.6	15.0	0.60	110	—	—	—	..
Port Leyden	Tap, public supply	4/22/12	Trace	Clear	54	51	.008	.018	.001	0.80	1.00	20.8	16.0	0.60	800	+	—	—	..
Port Leyden	Tap, public supply	9/10/12	Trace	Clear	55	39	.004	.006	.001	0.90	0.75	27.3	15.0	0.60	20	+	—	—	..
Port Leyden	Tap, public supply	10/28/12	2	Clear	48	36	.012	.010	.001	0.88	0.87	19.5	16.0	1.30	750	+	—	—	..
Port Leyden	Tap, public supply	12/ 9/12	Trace	Clear	51	39	.010	.046	Trace	0.88	0.87	24.7	13.0	0.80	240	—	—	—	..
Portville	Tap, public supply	1/22/12	5	5	37	26	.005	.012	.001	0.16	0.25	23.4	19.0	0.80	15,000	+	+	+	..
Portville	Tap, public supply	2/26/12	1	3	46	32	.008	.016	Trace	0.18	0.87	26.0	20.0	0.80	2,500	—	—	—	..
Portville	Tap, public supply	4/12/12	15	25	47	27	.006	.044	Trace	0.04	1.00	26.0	15.0	1.30	1,400	+	—	—	..
Portville	Tap, public supply	9/26/12	Trace	Trace	63	48	.002	.004	.001	0.26	0.75	42.9	37.0	0.70	100,000	+	+	—	..
Portville	Tap, public supply	11/15/12	10	3	53	40	.006	.036	Trace	0.08	1.00	35.1	22.0	1.00	4,100	—	—	—	..
Portville	Tap, public supply	12/18/12	5	Clear	45	35	.024	.036	.001	0.14	1.00	32.5	26.0	1.20	2,000	—	—	—	..
Potsdam	Tap, public supply	1/ 8/13	40	10	44	24	.020	.110	Trace	0.16	1.25	18.2	6.0	11.00	550	+	+	—	..
Potsdam	Tap, public supply	2/12/12	45	5	66	36	.008	.098	Trace	0.26	0.37	19.5	13.0	16.24	.....	.....	.....	.....	..
Potsdam	Pump station, public supply	2/21/12	50	Clear	61	28	.020	.120	Trace	0.24	1.50	27.3	14.0	16.80	250	+	—	—	..
Potsdam	Tap at American Express office	2/21/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	475	+	+	—	..
Potsdam	Tap at Fuller's residence	2/21/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	350	+	+	—	..
Potsdam	Tap, public supply	3/15/12	40	Trace	69	46	.032	.250	.003	0.24	0.75	27.3	18.0	15.80	270	+	+	—	..
Potsdam	Tap, public supply	4/19/12	65	20	48	16	.004	.156	.001	0.14	0.50	14.3	4.0	12.60	1,100	+	—	—	..
Potsdam	Tap, public supply	9/ 7/12	60	Trace	90	66	.008	.124	Trace	0.08	0.75	29.9	21.0	15.60	325	+	+	+	..
Potsdam	Tap, public supply	10/25/12	55	3	70	40	.014	.166	Trace	0.24	0.50	24.7	15.0	18.00	500	+	—	—	..
Potsdam	Tap, public supply	12/ 6/12	45	Trace	53	27	.012	.126	.001	0.08	1.00	22.1	9.0	12.80	5,600	+	—	—	..
Poughkeepsie	Raw water	1/16/12	20	15	114	91	.046	.114	.012	0.36	2.75	50.0	37.0	5.40	2,100	+	+	+	..
Poughkeepsie	Filtered water	1/16/12	.....	Clear	94	75	.032	.078	Trace	0.40	2.75	50.0	37.0	4.40	4	—	—	—	..
Poughkeepsie	Tap, public supply	2/20/12	15	Clear	99	87	.010	.064	Trace	0.36	3.37	50.0	47.0	6.20	30	—	—	—	..
Poughkeepsie	Tap, public supply	4/30/12	Trace	Clear	76	65	.004	.048	Trace	0.26	1.75	39.0	22.0	1.60	10	—	—	—	..
Poughkeepsie	Tap, State Hospital	5/ 8/12	18	Clear	69	47	.002	.058	Trace	0.24	1.50	33.8	28.0	4.50	110	+	+	..	..
Poughkeepsie	Tap, public supply	8/27/12	13	Clear	145	118	.004	.038	Trace	0.26	10.00	60.0	54.0	4.60	2,600	+	—	—	..
Poughkeepsie	Tap, public supply	10/15/12	30	Trace	139	117	.014	.054	Trace	0.14	8.00	70.0	62.0	9.10	120	+	—	—	..
Poughkeepsie	Tap, public supply	12/17/12	20	Clear	99	58	.030	.078	Trace	0.10	3.75	58.6	45.0	6.30	20	+	—	—	..
Prospect	Fountain, public supply	2/15/12	Trace	Clear	166	145	.014	.022	Trace	1.60	1.00	131.4	123.0	0.50	15	—	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Prospect	Tap, public supply	3/20/12	Trace	Clear	151	130	.010	.010	Trace	2.10	1.12	120.0	120.0	0.30	300	—	—	—	..
Prospect	Fountain, public supply	4/23/12	Trace	Clear	161	149	.006	.016	.001	1.20	1.00	131.4	118.0	0.10	60	—	—	—	..
Prospect	Fountain, public supply	9/11/12	Trace	Clear	161	140	.012	.006	Trace	1.20	1.25	125.8	124.0	0.50	30	—	—	—	..
Prospect	Fountain, public supply	12/10/12	Trace	Clear	155	145	.012	.014	.001	1.00	1.25	125.8	118.0	0.20	50	—	—	—	..
Pulaski	Tap, public supply	1/11/12	10	7	101	85	.028	.056	.001	0.60	2.87	67.1	63.0	2.10	1,500	+	+	+	..
Pulaski	Tap, public supply	3/ 1/12	15	3	86	66	.028	.056	.001	0.48	2.25	44.3	41.0	3.20	1,200	+	+	—	..
Pulaski	Tap, public supply	4/25/12	35	5	64	52	.014	.132	.001	0.16	1.50	40.3	34.0	7.30	3,800	+	+	+	..
Pulaski	Tap, public supply	10/31/12	25	Trace	112	89	.032	.114	.001	0.50	2.50	61.4	60.0	3.50	900	+	+	+	..
Pulaski	Tap, public supply	11/29/12	25	1	101	74	.014	.082	.001	0.50	2.25	58.6	47.0	4.10	1,000	+	+	—	..
Randolph	Tap, public supply	4/15/12	Trace	Clear	92	80	.004	.012	Trace	0.24	1.00	80.0	78.0	0.20	475	—	—	—	..
Randolph	Tap, public supply	9/23/12	Trace	Clear	148	121	.004	.014	.001	0.26	1.50	108.6	91.0	0.50	22,000	—	—	—	..
Ravena	Tap, public supply	1/22/12	5	Trace	139	115	.016	.040	.002	0.52	2.50	91.4	86.0	0.50	325	+	—	—	..
Ravena	Tap, public supply	2/26/12	12	25	108	85	.012	.128	.003	0.40	2.25	40.3	33.0	5.50	42,500	+	+	+	..
Ravena	Tap, public supply	4/ 6/12	10	20	85	70	.008	.074	.001	0.36	1.50	47.1	36.0	2.30	600	+	+	—	..
Ravena	Tap, public supply	10/ 4/12	...	...	...	...	...	...	...	...	...	...	...	...	100	+	+	—	..
Ravena	Tap, public supply	11/ 9/12	20	10	99	85	.012	.110	.001	0.20	2.00	60.0	52.0	4.20	3,700	+	+	+	..
Ray Brook	Tap, State Hospital for Treatment of																		

Rensselaer	Purified water	1/30/12	5	Trace	134	90	.106	.078	Trace	0.20	4.75	58.6	30.0	10.38	2	—	—	—	..
Rensselaer	Effluent unit No. 1	1/30/12													30	+	+	—	..
Rensselaer	Effluent unit No. 4	1/30/12													50	+	+	—	..
Rensselaer	Effluent unit No. 8	1/30/12													800	+	+	+	..
Rensselaer	Raw Hudson river water	3/ 6/12	30	Trace	108	72	.025	.167	.002	0.16	4.00	61.4	46.0	16.80	5,300	..	..	+	+
Rensselaer	Purified water	3/ 6/12	10	Clear	156	118	.127	.098	Trace	0.16	5.25	67.1	39.0	11.00	30	—	—	—	..
Rensselaer	Effluent unit No. 6	3/ 6/12													200	+	+	—	..
Rensselaer	Effluent unit No. 7	3/ 6/12													210	+	+	+	..
Rensselaer	Raw Hudson river water	4/ 9/12	20	140	83	57	.026	.198	.004	0.16	1.25	27.3	23.0	10.60	6,000	..	..	+	+
Rensselaer	Purified water	4/ 9/12	Trace	Clear	70	55	.024	.114	Trace	0.16	1.50	37.7	10.0	1.30	2	—	—	—	..
Rensselaer	Effluent unit No. 4	4/ 9/12													20	+	—	—	..
Rensselaer	Effluent unit No. 8	4/ 9/12													60	—	—	—	..
Rensselaer	Raw Hudson river water	5/ 8/12	22	15	88	54	.008	.104	.002	0.08	1.75	35.1	31.0	8.40	1,400	..	..	+	+
Rensselaer	Purified water	5/ 8/12	Trace	Clear	90	69	.008	.044	Trace	0.04	2.75	45.7	17.0	3.00	10	—	—	—	..
Rensselaer	Effluent filter unit No. 4	5/ 8/12													80	+	—	—	..
Rensselaer	Effluent filter unit No. 8	5/ 8/12													1 0	+	+	—	..
Rensselaer	Raw Hudson river water	6/ 5/12	38	20	76	54	.014	.128	.002	0.10	1.87	35.1	34.0	8.00	2,800	..	..	+	+
Rensselaer	Purified water	6/ 5/12	Trace	Clear	84	64	.008	.038	Trace	0.14	2.50	37.7	23.0	2.30	40	—	—	—	..
Rensselaer	Effluent filter unit No. 1	6/ 5/12													50	+	—	—	..
Rensselaer	Effluent filter unit No. 7	6/ 5/12													30	+	—	—	..
Rensselaer	Raw Hudson river water	7/ 9/12	65	7	213	148	.062	.194	.002	0.14	5.50	71.4	64.0	26.40	7,100	..	..	+	+
Rensselaer	Purified water	7/ 9/12	12	Clear	216	166	.038	.082	.001	0.14	6.25	74.3	44.0	14.40	1	—	—	—	..
Rensselaer	Effluent unit No. 6	7/ 9/12													35	+	+	+	..
Rensselaer	Raw Hudson river water	9/ 5/12	37	5	198	167	.006	.144	.004	0.14	5.00	65.7	62.0	16.40	22,500			+	+
Rensselaer	Purified water	9/ 5/12	Trace	Clear	194	170	.020	.046	Trace	0.14	6.00	75.7	48.0	5.20	3	—	—	—	..
Rensselaer	Effluent filter unit No. 4	9/ 5/12													150	+	+	—	..
Rensselaer	Effluent filter unit No. 7	9/ 5/12													300	+	+	+	..
Rensselaer	Raw Hudson river water	10/18/12	40	15	162	113	.020	.170	.002	0.14	5.50	70.0	64.0	28.80	18,500	+	—	—	..
Rensselaer	Purified water	10/18/12	12	Clear	157	121	.016	.112	Trace	0.14	5.75	77.1	49.0	15.00	40	+	—	—	..
Rensselaer	Raw Hudson river water	12/20/12	35	20			.052	.106	.002	0.16	2.25	51.4	41.0	15.80	3,200			+	—
Rensselaer	Purified water	12/20/12	10	2	108	87	.054	.070	.001	0.16	3.00	51.4	24.0	9.00	9	+	—	—	..
Rensselaer	Effluent filter unit No. 4	12/20/12													550	+	+	—	..
Rensselaer	Effluent filter unit No. 7	12/20/12													250	+	+	—	..
Rhinebeck	Tap, public supply	1/16/12	Trace	Clear	193	173	.012	.020	Trace	0.52	4.00	105.8	138.0	0.10	50	+	—	—	..
Rhinebeck	Tap, public supply	2/20/12	5	Clear	141	131	.018	.038	Trace	0.52	1.00	94.2	92.0	1.64	160	+	—	—	..
Rhinebeck	Tap, public supply	3/26/12													40	+	—	—	..
Rhinebeck	Tap, public supply	4/29/12	Trace	Clear	164	145	.002	.032	Trace	1.08	3.50	128.6	101.0	0.70	30	+	—	—	..
Rhinebeck	Tap, public supply	8/27/12	20	3	102	86	.008	.084	Trace	0.08	1.62	81.4	79.0	2.80	15,500	+	+	—	..
Rhinebeck	Dug well, public supply	10/ 3/12	5	Trace	255	214	.004	.022	.001	0.60	6.00	160.0	156.0	0.90	650	+	+	+	..
Rhinebeck	Distributing reservoir, public supply	10/ 3/12	10	Trace	185	155	.006	.042	.003	0.04	2.50	111.4	111.0	1.80	1,400	—	—	—	..
Rhinebeck	Tap on discharge, deep well, public supply	10/ 3/12													140	+	—	—	..
Rhinebeck	Fountain, public supply	10/ 3/12	5	Trace	211	184	.008	.030	.003	0.04	3.87	83.2		0.80	1,000	—	—	—	..
Rhinebeck	Tap, public supply	10/14/12	Trace	Clear	217	204	.086	.034	.010	0.02	3.25	160.0	139.0	0.90	160	—	—	—	..
Rhinebeck	Tap, public supply	12/17/12	Trace	Clear	213	172	.080	.030	.010	0.04	3.50	83.2		1.60	30	—	—	—	..
Richfield Springs	Tap, public supply	2/ 2/12	Trace	Clear	175	147	.014	.044	Trace	0.52	1.87	134.2	132.0	1.80	1,100	+	—	—	..
Richfield Springs	Tap, public supply	3/ 6/12	15	Clear	131	110	.034	.103	Trace	0.20	1.25	105.8	104.0	3.40	900	+	—	—	..
Richfield Springs	Tap, public supply	10/24/12	15	5	110	99	.008	.146	Trace	0.06	0.50	77.1	75.0	4.00	475	—	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Richford	Tap, public supply	9/27/12	5	20	43	34	.008	.074	.002	0.32	0.62	19.5	15.0	4.40	13,000	+	+	+	..
Richmondville	Tap, public supply	2/ 2/12	10	70	105	78	.028	.092	.001	0.36	1.50	48.6	47.0	2.60	1,100	+	+	+	..
Richmondville	Tap, public supply	4/12/12	10	10	42	33	.016	.056	Trace	0.24	1.00	20.8	11.0	1.50	400	+	+	—	..
Richmondville	Tap, public supply	9/10/12	5	13	129	109	.046	.140	.001	0.06	2.75	84.3	79.0	4.20	1,700	+	+	+	..
Richmondville	Tap, public supply	11/16/12	5	5	62	48	.010	.064	.001	0.20	1.00	32.5	19.0	1.95	850	+	—	—	..
Ripley	Tap, public supply	3/ 8/12	10	Clear	89	57	.020	.056	.001	0.52	2.50	52.9	35.0	1.40	400	—	—	—	..
Ripley	Tap, public supply	4/16/12	15	5	85	64	.010	.040	.001	0.34	1.75	51.4	32.0	1.40	950	+	—	—	..
Ripley	Tap, public supply	9/21/12	5	Clear	129	96	.004	.042	.001	0.10	4.50	72.9	62.0	1.40	160	+	+	—	..
Ripley	Tap, public supply	12/11/12	15	3	185	70	.020	.064	Trace	0.16	3.25	50.0	39.0	1.90	210	+	—	—	..
Rochester	Tap in laboratory	5/ 7/12	Trace	Clear	427	329	.004	.024	.001	0.80	16.12	285.5	255.5	0.40	......	......	......	......	..
Rochester	Tap in diet kitchen	5/ 7/12	......	......	......	......	......	......	......	......	......	......	......	......	35	—	—	—	..
Rochester	Tap in infirmary	5/ 7/12	......	......	......	......	......	......	......	......	......	......	......	......	20	+	—	—	..
Rome	Tap, White's hotel, public supply	1/20/12	......	......	......	......	......	......	......	......	......	......	......	......	120	+	+	—	..
Rome	Tap, Empire hotel, public supply	1/20/12	......	......	......	......	......	......	......	......	......	......	......	......	180	+	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
St. Johnsville	Reservoir, one mile from village	10/ 2/12	5	Trace	120	110	.004	.042	.001	0.14	0.75	100.0	96.0	1.40	270	—	—	—	..
St. Johnsville	Fountain, auxiliary old spring supply	10/ 2/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	+	—	—	..
St. Regis Falls	Tap, public supply	9/26/12	60	Clear	60	48	.002	.118	.001	0.04	0.75	15.6	5.0	13.60	250	—	—	—	..
Salamanca	Tap, public supply	1/23/12	10	Trace	19	13	.028	.020	Trace	0.08	0.37	11.1	4.0	1.37	1,050	+	—	—	..
Salamanca	Tap, public supply	4/15/12	15	5	14	9	.004	.034	.001	Trace	0.38	4.8	5.0	1.30	700	+	—	—	..
Salamanca	Tap, public supply	9/23/12	1	Clear	87	72	.002	.024	.001	0.36	3.25	54.3	51.0	0.80	1,600	+	+	—	..
Salamanca	Tap, public supply	11/12/12	10	3	36	26	.008	.048	.001	0.02	0.62	19.5	5.0	2.20	230	+	—	—	..
Salamanca	Tap, public supply	12/16/12	5	Clear	36	25	.010	.036	.001	0.04	1.00	18.2	8.0	1.30	250	+	—	—	..
Sandy Creek	Tap, public supply	2/29/12	Trace	Clear	55	40	.006	.036	Trace	0.78	1.00	32.5	30.0	1.20	700	—	—	—	..
Sandy Creek	Tap, public supply	4/25/12	15	5	37	29	.002	.066	Trace	0.26	0.75	26.0	20.0	6.00	1,200	+	+	—	..
Sandy Creek	Tap, public supply	10/30/12	5	Clear	61	39	.008	.090	Trace	0.60	1.50	36.4	33.0	2.40	400	+	+	—	..
Saratoga Springs	Tap, public supply	4/25/12	20	5	68	54	.008	.066	.001	0.10	1.00	42.9	42.0	2.10	120	+	—	—	..
Saugerties	Tap, public supply	1/23/12	7	Trace	42	32	.018	.030	.001	0.24	1.37	12.7	8.0	0.90	210	+	—	—	..
[illegible]	[illegible]	3/ 1/12	15	Trace	41	27	.008	.026	.001	0.16	1.25	11.1	4.0	2.50	600	+	+	—	..
						[illegible]	.010	.020	Trace	0.16	1.00	11.1	5.0	1.80	100	+	—	—	..
															80	+	—	—	..

Schuylerville	Tap, public supply	12/28/12	Trace	Clear	119	103	.016	.010	.001	0.70	1.00	100.0	93.0	0.70	80	—	—	—
Scotia	Tap, public supply	1/26/12	Trace	Clear	167	133	.024	.024	.001	1.20	3.00	108.6	100.0	0.10	7	—	—	—
Scotia	Tap, public supply	3/12/12	Trace	Clear	179	154	.018	.032	Trace	1.50	3.25	131.4	108.0	0.20	2	—	—	—
Scotia	Tap, public supply	4/16/12	Trace	Clear	146	135	.008	.004	Trace	1.20	3.00	111.4	96.0	0.20	5	—	—	—
Scotia	Tap, public supply	5/24/12	Trace	Clear	168	135	.004	.010	Trace	1.08	2.87	101.5	89.0	0.10	4	—	—	—
Scotia	Tap, public supply	9/21/12	Trace	Clear	194	169	.006	.016	.001	1.70	3.75	117.2	106.0	0.60	10	—	—	—
Scotia	Tap, public supply	10/23/12	Trace	Clear	200	156	.012	.042	Trace	1.52	2.75	122.8	108.0	0.30	2	—	—	—
Scotia	Tap, public supply	12/12/12	Trace	Clear	162	144	.014	.038	Trace	1.00	2.50	128.6	96.0	0.70	3	—	—	—
Seneca Falls	Tap, public supply	2/12/12	Trace	Clear	306	221	.008	.032	Trace	0.48	53.00	131.4	123.0	0.90	.....	.....	.....	.....
Seneca Falls	Tap, public supply	3/20/12	5	Clear	230	200	.020	.058	.005	0.40	47.00	108.6	106.0	0.80	300	—	—	—
Seneca Falls	Tap, public supply	10/ 9/12	5	Trace	257	167	.014	.074	.002	0.18	48.00	108.6	94.0	1.60	800	—	—	—
Seneca Falls	Tap, public supply	11/26/12	5	Clear	240	211	.024	.080	.001	0.34	51.00	111.4	101.0	1.40	100	—	—	—
Seneca Falls	Tap, public supply	12/31/12	Trace	Clear	246	219	.028	.080	Trace	0.46	50.00	111.4	108.0	1.20	20	—	—	—
Sherburne	Tap, public supply	2/17/12	5	2	53	27	.012	.056	.001	0.72	2.25	26.0	26.0	1.40	250	—	—	—
Sherburne	Tap, public supply	3/28/12	5	Trace	56	42	.004	.042	Trace	0.68	1.75	26.0	20.0	1.30	10,500	+	—	—
Sherburne	Tap, public supply	5/ 3/12	15	10	55	38	.008	.088	Trace	0.26	1.50	22.1	16.0	1.70	190	+	—	—
Sherburne	Tap, public supply	10/24/12	10	3	62	52	.014	.086	Trace	0.04	1.75	38.4	29.0	1.60	200	+	—	—
Sherburne	Tap, public supply	12/ 5/12	10	Clear	41	31	.010	.072	.001	0.20	2.50	27.3	18.0	3.00	3,700	+	—	—
Sherman	Tap, public supply	3/ 7/12	5	Clear	156	132	.025	.060	Trace	1.44	2.00	117.2	108.0	0.90	190	+	+	—
Sherman	Tap, public supply	4/16/12	Trace	Clear	146	122	.008	.032	Trace	0.80	1.25	105.8	104.0	1.10	26,000	+	+	—
Sherman	Tap, public supply	9/23/12	40	25	166	131	.008	.196	.001	0.26	2.50	122.8	111.0	9.60	15,000	+	+	+
Sherman	Tap, public supply	11/11/12	20	Clear	139	126	.012	.074	.001	0.72	1.50	117.2	103.0	3.00	1,900	+	+	—
Sherman	Tap, public supply	12/13/12	15	5	133	116	.010	.044	.001	0.90	1.25	105.8	106.0	1.50	11,500	+	+	—
Sidney	Tap, Peckham brook supply	1/31/12	22	5	37	28	.030	.052	.001	0.20	1.00	18.2	13.0	2.50	40	—	—	—
Sidney	Tap, Collar pond supply	1/31/12	20	5	41	20	.024	.054	Trace	0.24	1.25	14.3	13.0	1.60	160	+	—	—
Sidney	Tap, Peckham brook supply	3/ 6/12	5	Trace	33	15	.008	.058	.001	0.34	1.00	12.7	5.0	2.30	2,400	+	—	—
Sidney	Tap, Collar pond supply	3/ 6/12	10	Clear	39	19	.006	.046	Trace	0.34	1.25	16.9	5.0	2.30	2,500	+	+	—
Sidney	Tap, Peckham brook supply	4/10/12	5	5	35	24	.008	.068	Trace	0.14	0.75	11.1	5.0	2.30	100	+	+	—
Sidney	Tap, Collar pond supply	4/10/12	5	5	36	24	.008	.074	Trace	0.16	0.75	9.5	3.0	2.00	140	+	—	—
Sidney	Tap, Peckham brook supply	9/11/12	18	3	60	41	.002	.098	.001	0.08	0.25	23.4	23.0	3.50	130	+	+	—
Sidney	Tap, Collar pond supply	9/11/12	10	2	61	50	.002	.072	Trace	0.10	0.75	22.1	21.0	2.30	70	+	—	—
Sidney	Tap, Peckham brook supply	10/25/12	20	20	63	40	.014	.186	Trace	0.10	1.00	23.4	14.0	5.50	9,100	+	+	+
Sidney	Tap, Collar pond supply	10/25/12	20	5	52	31	.008	.104	Trace	0.08	0.50	19.5	16.0	2.90	2,650	+	—	—
Sidney	Tap, Peckham brook supply	12/ 6/12	15	Trace	29	18	.020	.072	Trace	0.06	0.75	16.9	10.0	3.10	750	+	+	—
Sidney	Tap, Collar pond supply	12/ 6/12	10	Trace	24	14	.008	.070	Trace	0.16	1.00	11.1	9.0	2.40	950	+	—	—
Silver Creek	Tap, public supply	2/28/12	5	30	138	107	.018	.058	Trace	0.40	2.50	65.7	58.0	1.30	1,200	+	+	—
Silver Creek	Tap, public supply	4/16/12	10	60	110	85	.040	.078	.004	0.36	1.25	48.6	36.0	2.80	1,700	+	+	—
Silver Creek	Reservoir at dam	9/19/12	20	12	164	140	.032	.148	.001	0.06	2.75	111.4	93.0	3.30	1,000	+	+	+
Silver Creek	Reservoir at head gates	9/19/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,400	+	+	+
Silver Creek	Tap, public supply	9/21/12	20	25	190	166	.002	.150	.001	0.08	3.25	117.2	91.0	4.30	11,500	+	+	—
Silver Creek	Tap, public supply	11/ 8/12	20	20	119	93	.014	.096	.001	0.30	2.50	71.4	64.0	3.30	700	+	—	—
Silver Creek	Tap, public supply	12/10/12	20	5	114	102	.018	.086	Trace	0.34	2.25	65.7	58.0	1.20	190	+	+	—
Silver Springs	Tap, public supply	1/18/12	5	10	231	221	.020	.018	Trace	0.24	1.75	188.5	182.0	1.20	90	+	—	—
Silver Springs	Tap, public supply	3/11/12	20	5	113	77	.025	.160	Trace	0.68	2.00	65.7	51.0	5.40	1,900	+	+	—
Silver Springs	Tap, public supply	3/30/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	600	+	+	—
Silver Springs	Flowing well No. 2, public supply	4/20/12	5	Trace	251	231	.122	.016	Trace	Trace	15.75	169.0	.....	0.60	.....	.....	.....	.....
Silver Springs	Tap, public supply	11/20/12	Trace	Clear	245	213	.020	.040	.002	0.14	5.25	195.0	186.0	0.50	60	—	—	—
Sinclairville	Tap, public supply	3/ 6/12	5	Clear	128	104	.018	.014	.001	1.44	3.00	97.1	88.0	0.30	15	—	—	—

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Nitrogen as — Albuminoid ammonia	Nitrogen as — Nitrites	Nitrogen as — Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Sinclairville	Tap, public supply	4/17/12	Trace	Clear	155	137	.004	.006	Trace	1.60	3.50	115.8	90.0	0.40	20	+	—	—	..
Sinclairville	Tap, public supply	12/13/12	5	Clear	149	131	.006	.024	.001	1.50	4.25	105.8	99.0	0.30	120	—	—	—	..
Skaneateles	Tap, old supply	2/22/12	Trace	Clear	146	126	.008	.048	.001	0.60	1.75	100.0	96.0	0.50	375	+	+	—	..
Skaneateles	Tap, municipal supply	2/22/12	Trace	Clear	134	121	.014	.030	Trace	0.48	1.75	97.2	90.0	0.75	35	—	—	—	..
Skaneateles	Tap, municipal supply	11/ 2/12	5	Trace	120	104	.022	.056	.003	0.36	1.50	101.8	96.0	1.30	110	—	—	—	..
Skaneateles	Tap, company supply	11/ 2/12	5	Trace	116	105	.014	.070	Trace	0.46	1.50	102.8	95.0	1.00	100	+	—	—	..
Slingerland	Tap, public supply	2/ 2/12	Trace	Clear	186	175	.024	.038	Trace	0.72	1.87	148.6	145.0	0.20	180	+	—	—	..
Slingerland	Tap, public supply	4/18/12	10	3	144	132	.004	.016	.001	0.36	1.00	114.2	92.0	0.30	200	+	—	—	..
Slingerland	Tap, public supply	11/ 2/12	5	5	196	166	.006	.048	Trace	0.64	1.25	142.8	140.0	1.20	240	+	+	—	..
Sloan	Tap, public supply	2/28/12	5	5	147	118	.020	.094	Trace	0.14	7.50	105.8	98.0	1.30	40	—	—	—	..
Sloan	Tap, public supply	4/20/12	10	15	135	114	.004	.040	.001	0.14	7.00	102.8	87.0	0.90	500	+	—	—	..
Sloan	Tap, public supply	9/21/12	5	Clear	146	120	.002	.038	.001	0.06		100.0	95.0	1.50	850	+	—	—	..
Sloan	Tap, public supply	11/ 7/12													200	—	—	—	..
Sloan	Tap, public supply	11/20/12	5	3	150	123	.018	.082	.001	0.06	7.00	108.6	96.0	2.10					..
Sloan	Tap, public supply	12/19/12	10	10	143	120	.012	.070	Trace	0.08	8.00	120.0	96.0	1.50	275	+	—	—	..
Sloatsburg	Portage lake, near outlet, public supply	9/24/12	5	Trace	44	24	.004	.066	.001	0.02	1.50	23.4	8.0	1.80	900	+	+	—	..
Sloatsburg	Lower reservoir, public supply	9/24/12													1,100	+	+	—	..
Sloatsburg	Tap, public supply	9/24/12	30	10	69	36	.004	.136	.001	0.12	2.50	27.3	20.0	5.40	350	+	+	—	..
Smyrna	Tap, public supply	1/ 5/12	Trace	Clear	306	277	.024	.040	.003	4.00	20.00	191.4	186.0	0.30	30	—	—	—	..
Smyrna	Tap, public supply	2/17/12	Trace	Clear	388	330	.006	.036	Trace	5.20	42.00	264.5	217.0	0.50	20	—	—	—	..
Smyrna	Tap, public supply	3/27/12	Trace	Clear	311	265	.004	.004	.002	4.80	16.75	208.0	183.0	0.30	40	+	—	—	..
Smyrna	Tap, public supply	5/ 2/12	Trace	Clear	301	257	.004	.038	.001	4.80	18.00	171.4	158.0	0.10	350	—	—	—	..
Smyrna	Tap, public supply	9/13/12	Trace	Clear	530	510	.002	.006	Trace	4.80	35.00	300.0	217.0	0.40	375	+	—	—	..
Smyrna	Tap, public supply	10/23/12	Trace	Clear	380	325	.010	.020	Trace	4.40	29.75	235.5	219.0	0.60	300	—	—	—	..
Smyrna	Tap, public supply	12/ 4/12	Trace	Clear	371	292	.008	.052	.001	6.00	24.75	214.5	208.0	0.80	80	—	—	—	..
Solvay	Tap, public supply	1/12/12	Trace	Clear	1,471	1,234	.012	.008	.001	2.40	6.37	971.0	214.0	0.10	35	—	—	—	..
Solvay	Tap, public supply	2/16/12	Trace	Clear	1,408	1,334	.012	.020	Trace	2.80	6.12	686.0	212.0	0.50	10	—	—	—	..
Solvay	Tap, public supply	4/ 3/12	Trace	Clear	1,066	1,000	.008	.020	.001	2.40	5.00	714.0	189.0	0.20	200	—	—	—	..
Solvay	Tap, public supply	4/27/12	Trace	Clear	1,075	979	.002	.022	.005	2.80	6.25	714.0	213.0	1.00	30	—	—	—	..
Solvay	Tap, public supply	10/ 9/12	5	Clear	156	115	.010	.120	.001	0.04	2.00	100.0	100.0	1.70	90	+	—	—	..
Solvay	Tap, public supply	11/26/12	5	Trace	139	117	.010	.118	.001	0.04	2.25	108.6	106.0	2.60	30	—	—	—	..
Sonyea	Test well No. 5, Craig Colony	1/ 4/12	Trace	20	410	381	.028	.046	.001	0.20	9.62	257.0	230.0	0.10					..
Sonyea	Tap, creek water, Craig Colony	2/19/12	12	3	249	210	.006	.036	Trace	0.60	9.87	157.2	155.0	1.10	160	+	+	+	..
Sonyea	Tap, spring water, Craig Colony	2/19/12	Trace	Clear	446	391	.424	.066	.001	0.24	28.00	364.0	342.0	0.80	3	—	—	—	..

Sonyea	Tap, creek water, Craig colony	3/26/12	Trace	Trace	418	346	.250	.028	.002	1.02	31.00	......	285.0	0.10	20	+	−	−	..
Sonyea	Tap, spring water Craig Colony	3/26/12	Trace	Clear	363	302	.260	.038	.004	1.08	28.00	300.0	288.0	0.10	20	−	−	−	..
Sonyea	Tap, creek water, Craig Colony	4/22/12	Trace	1	354	324	.152	.026	.007	1.02	19.00	293.0	222.0	0.10	500	+	−	−	..
Sonyea	Tap, spring water, Craig Colony	4/22/12	Trace	Clear	429	387	.230	.028	.002	1.08	25.00	300.0	281.0	0.40	70	−	−	−	..
Sonyea	Tap, creek water, Craig Colony	4/23/12	......	......	......	......	......	......	......	......	......	......	......	......	100	−	−	−	..
Sonyea	Tap, spring water, Craig Colony	4/23/12	......	......	......	......	......	......	......	......	......	......	......	......	30	−	−	−	..
Sonyea	Tap, creek water, Craig Colony	5/21/12	12	1	245	212	.012	.032	.001	0.24	9.00	154.2	139.0	1.90	600	+	+	+	..
Sonyea	Tap, spring water, Craig Colony	5/21/12	Trace	Clear	425	391	.202	.042	.003	0.68	29.25	293.0	289.0	0.80	20	−	−	−	..
Sonyea	Tap, creek water, Craig Colony	6/18/12	Trace	Trace	273	240	.004	.032	.001	0.10	11.20	177.2	166.0	1.10	20	−	−	−	..
Sonyea	Tap, spring water, Craig Colony	6/18/12	Trace	Trace	469	432	.540	.034	.001	0.34	32.00	314.5	308.0	0.80	4	−	−	−	..
Sonyea	Tap, creek water, Craig Colony	7/24/12	8	12	235	208	.002	.038	Trace	0.02	8.75	177.2	156.0	1.30	220	+	+	−	..
Sonyea	Tap, spring water, Craig Colony	7/24/12	Trace	Clear	483	456	.348	.028	.001	0.60	31.00	307.0	340.0	0.30	17	−	−	−	..
Sonyea	Tap, spring water, Craig Colony	9/16/12	5	5	455	414	.424	.030	.004	0.24	29.00	314.5	314.0	1.20	1,300	−	−	−	..
Sonyea	Tap, creek water, Craig Colony	10/17/12	10	1	390	349	.184	.060	.001	0.16	18.00	312.0	259.0	1.00	140	+	−	−	..
Sonyea	Tap, spring water, Craig Colony	10/17/12	Trace	1	468	421	.416	.046	.001	0.34	26.00	390.0	323.0	0.80	30	−	−	−	..
Sonyea	Tap, creek water	11/15/12	10	5	300	267	.006	.068	Trace	0.06	7.75	180.0	152.0	2.10	300	+	−	−	..
Sonyea	Tap, spring water	11/15/12	Trace	Trace	455	420	.320	.056	Trace	0.30	23.75	325.0	287.0	1.00	70	−	−	−	..
South Glens Falls	Tap, public supply	1/31/12	5	2	69	40	.012	.020	.001	1.02	2.25	31.2	22.0	0.50	140	+	−	−	..
South Glens Falls	Tap, public supply	3/13/12	Trace	Clear	71	61	.02[illegible]	.024	.001	1.20	2.50	33.8	21.0	0.60	400	+	−	−	..
South Glens Falls	Tap, public supply	4/19/12	10	Trace	58	50	.018	.036	.001	0.80	2.50	32.5	22.0	1.30	140	+	+	−	..
South Glens Falls	Tap, public supply	9/18/12	12	5	88	70	.002	.030	.001	1.00	2.50	32.5	30.0	2.00	5,900	+	+	+	..
South Glens Falls	Tap, public supply	11/13/12	20	Trace	82	66	.024	.034	.001	1.00	2.25	36.4	27.0	2.60	400	+	−	−	..
South Glens Falls	Tap, public supply	12/27/12	Trace	Clear	78	66	.016	.008	.001	1.40	2.75	29.9	23.0	1.00	180	+	−	−	..
South New Berlin	Tap, public supply	1/31/12	1	3	53	38	.032	.044	Trace	1.44	1.87	31.2	25.0	0.20	1,100	+	−	−	..
South New Berlin	Tap, public supply	3/8/12	Trace	Clear	66	47	.010	.036	.001	1.20	2.00	23.4	17.0	0.30	160	+	−	−	..
South New Berlin	Tap, public supply	4/10/12	Trace	Clear	40	22	.004	.036	.001	0.50	1.25	18.2	12.0	0.40	160	+	−	−	..
South New Berlin	Tap, public supply	10/12/12	Trace	Clear	55	35	.004	.024	.001	1.20	1.25	26.0	21.0	1.20	......	+	−	−	..
South New Berlin	Tap, public supply	11/15/12	Trace	Clear	42	31	.026	.020	.002	0.80	2.00	20.8	15.0	0.40	30	+	−	−	..
Spencerport	Well, public supply	10/30/12	5	Trace	186	171	.004	.042	Trace	0.02	3.75	137.2	127.0	0.80	......	......	......	......	..
Spencerport	Tap, public supply	11/21/12	10	Trace	189	179	.028	.028	.010	0.06	2.75	148.6	122.0	1.30	4,100	−	−	−	..
Spring Valley	Tap, public supply	1/25/12	5	Clear	115	101	.020	.016	.002	0.90	2.75	94.3	92.0	0.20	30	−	−	−	..
Spring Valley	Tap, public supply	2/28/12	Trace	Clear	110	94	.004	.008	Trace	1.00	2.75	84.3	83.0	0.10	10	−	−	−	..
Spring Valley	Tap, public supply	4/2/12	Trace	Clear	111	95	[illegible]	Trace	.001	1.02	3.00	91.4	86.0	0.10	7,600	−	−	−	..
Spring Valley	Tap, public supply	10/3/12	5	Clear	150	121	.008	.014	Trace	1.20	2.75	94.2	84.0	0.10	1,300	−	−	−	..
Spring Valley	Tap, public supply	11/7/12	Trace	Clear	108	89	.006	.018	.001	1.08	3.50	87.1	84.0	0.20	1,500	−	−	−	..
Spring Valley	Tap, public supply	12/31/12	Trace	Clear	112	92	.008	.006	Trace	1.02	2.87	88.6	82.0	0.40	3,000	−	−	−	..
Springville	Tap, public supply	11/12/12	Trace	Clear	179	154	.006	.024	.001	1.60	2.50	120.0	116.0	0.80	......	−	−	−	..
Springville	Tap, public supply	12/16/12	Trace	Clear	174	152	.006	.012	.001	1.70	2.50	134.2	115.0	0.80	40	−	−	−	..
Suffern	Tap, public supply	1/24/12	Trace	Clear	87	73	.032	.042	.001	0.32	3.25	64.3	54.0	1.56	4,900	+	−	−	..
Suffern	Tap, public supply	3/1/12	Trace	Clear	61	49	.030	.070	Trace	0.26	2.75	31.2	31.0	2.60	13,000	+	+	−	..
Suffern	Tap, public supply	4/3/12	Trace	Clear	69	61	.010	.026	Trace	0.10	2.25	44.3	24.0	0.70	2,600	+	−	−	..
Suffern	Tap, public supply	10/3/12	18	Clear	113	77	.006	.048	Trace	0.06	3.50	64.3	......	2.30	1,000	−	−	−	..
Suffern	Tap, public supply	11/8/12	20	Clear	109	81	.010	.088	.001	0.08	4.50	55.7	39.0	3.50	600	+	−	−	..
Suffern	Tap, public supply	12/26/12	5	Trace	91	64	.020	.068	Trace	0.20	3.75	50.0	39.0	1.30	4,500	−	−	−	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	2/19/12	Trace	Clear	124	104	.010	.048	Trace	0.48	1.50	101.5	97.0	0.70	20	−	−	−	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	3/29/12	5	Clear	111	104	.006	.046	Trace	0.40	1.50	100.0	96.0	0.80	80	−	−	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	4/23/12	5	5	116	109	.002	.038	Trace	0.40	1.00	92.9	92.0	0.60	240	—	—	—	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	5/21/12	7	2	105	94	.006	.038	Trace	0.44	1.50	90.0	92.0	1.40	30	—	—	—	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	10/15/12	5	Trace	129	115	.004	.046	.002	0.40	1.25	105.8	94 0	1.70	110	+	—	—	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	11/13/12	5	Clear	127	105	.014	.076	.001	0.50	1.50	101.5	95.0	1.20	3,500	—	—	—	..
Tarrytown	Raw water	1/17/12	15	Trace	90	55	.028	.116	.001	0.26	6.25	40.3	30.0	1.80	80	+	—	—	..
Tarrytown	Effluents of high service filters	1/17/12	5	Clear	81	61	.020	.090	Trace	0.30	6.25	41.6	31.0	1.30	10	—	—	—	..
Tarrytown	Effluents of low service filters	1/17/12	....	....	....	....	....	....	....	....	....	....	....	....	20	—	—	—	..
Tarrytown	Raw water	2/21/12	15	5	99	80	.052	.152	.003	0.30	6.00	42.9	31.0	2.90	180	—	—	—	..
Tarrytown	Effluents of high service filters	2/21/12	10	3	94	78	.024	.110	.003	0.26	6.00	44.3	31.0	2.50	120	—	—	—	..
Tarrytown	Effluents of low service filters	2/21/12	....	....	....	....	....	....	....	....	....	....	....	....	30	—	—	—	..
Tarrytown		3/27/12	5	5	102	86	.032	.110	.001	0.48	6.00	45.7	25.0	1.30	375	+	+	—	..
[illegible]															50	—	—	—	..
															[illegible]			—	

Theresa	Tap, public supply	9/ 9/12	25	Trace	119	94	.002	.092	Trace	0.16	2.12	60.0	59.0	3.90	25,000	+	+	—	..
Theresa	Tap, public supply	10/26/12	30	Clear	104	82	.032	.184	Trace	0.10	2.25	67.1	62.0	6.00	120	+	—	—	..
Theresa	Tap, public supply	12/ 9/12	45	10	81	55	.024	.108	Trace	0.24	1.15	39.0	35.0	10.40	12,500	+	+	+	..
Ticonderoga	Tap, public supply	1/ 3/12	5	5	36	27	.016	.066	.001	0.04	0.75	24.7	23.0	1.20	30	—	—	—	..
Ticonderoga	Tap, public supply	2/ 6/12	10	3	40	27	.006	.050	Trace	0.04	1.00	26.0	21.0	1.10	30	+	—	—	..
Ticonderoga	Tap, public supply	3/12/12	Trace	Clear	30	26	.010	.068	Trace	0.06	1.00	26.0	24.0	1.30	40	—	—	—	..
Ticonderoga	Tap, public supply	4/16/12	Trace	Clear	55	35	.010	.040	Trace	Trace	0.75	24.7	21.0	1.20	80	—	—	—	..
Ticonderoga	Tap, public supply	9/ 4/12	Trace	7	60	40	.008	.038	.001	0.04	1.00	28.6	25.0	1.50	60	+	—	—	..
Ticonderoga	Tap, public supply	10/22/12	10	15	44	35	.004	.088	Trace	0.04	1.00	29.9	24.0	1.70	90	+	+	—	..
Ticonderoga	Tap, public supply	12/ 3/12	15	3	96	68	.008	.088	Trace	0.14	1.00	57.1	56.0	2.70	600	+	—	—	..
Tonawanda	Tap, public supply	1/24/12	5	15	151	121	.026	.068	.002	0.10	8.00	111.4	99.0	1.20	200	+	—	—	..
Tonawanda	Tap, public supply	3/ 8/12	10	5	132	110	.014	.061	Trace	0.10	7.00	105.8	98.0	0.90	130	+	—	—	..
Tonawanda	Tap, public supply	4/2u/12	10	10	139	122	.004	.032	.003	0.06	7.00	100.0	89.0	0.90	500	+	—	—	..
Tonawanda	Tap, public supply	9/19/12	5	1	166	132	.002	.084	.001	0.04	7.50	100.0	93.0	1.50	7,200	+	+	—	..
Tonawanda	Tap, public supply	11/22/12	10	30	174	152	.014	.098	Trace	0.06	7.75	105.8	96.0	2.60	300	+	+	—	..
Troy	Tap, low service	2/ 7/12	10	Trace	53	32	.062	.108	.001	0.40	1.75	31.2	24.0	2.40	190	+	+	—	..
Troy	Tap, high service	2/ 7/12	20	Trace	68	51	.020	.094	Trace	0.50	2.25	39.0	27.0	3.20	200	+	+	—	..
Troy	Tap, low service	4/ 4/12	15	15	70	58	.020	.084	.001	0.40	1.50	33.8	23.0	2.90	2,300	+	+	+	..
Troy	Tap, high service	4/ 4/12	20	30	76	61	.130	.136	.002	0.40	1.75	28.6	19.0	4.30	2,700	+	+	—	..
Troy	Tap, low service	5/14/12	8	10	94	67	.006	.114	.001	0.40	1.50	24.7	19.0	3.10	250	+	—	—	..
Troy	Tap, high service	5/14/12	10	10	109	80	.016	.134	.001	0.06	2.00	50.0	33.0	3.20	180	+	—	—	..
Tro	Tap, low service	6/ 4/12	7	18	76	45	.012	.130	.001	0.36	2.25	32.5	27.0	3.30	275	+	+	+	..
Troy	Tap, high service	6/ 4/12	10	35	69	47	.018	.222	.001	0.20	2.25	40.3	33.0	4.80	700	+	+	+	..
Troy	Tap, low service	10/22/12	15	10	68	42	.076	.192	.002	0.14	1.50	35.1	25.0	3.60	3,300	+	+	—	..
Troy	Tap, high service	10/22/12	15	10	76	45	.036	.194	.002	0.26	1.50	42.9	22.0	4.30	150	+	—	—	..
Troy	Tap, low service	12/17/12	15	5	68	53	.128	.120	.003	0.40	2.25	36.4	30.0	3.80	90	—	—	—	..
Troy	Tap, high service	12/17/12	35	5	58	27	.022	.120	Trace	0.24	2.50	27.3	16.0	6.20	250	+	—	—	..
Tuckahoe	Tap, public supply	1/19/12	10	5	112	95	.040	.118	.004	1.20	7.12	41.6	37 0	3.00	25,000	+	—	—	..
Tuckahoe	Tap, public supply	2/23/12	10	5	107	73	.080	.152	.005	1.20	8.00	50.0	29.0	4.00	325	—	—	—	..
Tuckahoe	Tap, public supply	3/27/12	15	5	103	60	.124	.136	.003	0.72	5.50	35.1	20.0	3.50	800	+	—	—	..
Tuckahoe	Tap, public supply	5/ 4/12	15	5	81	60	.012	.124	.003	0.72	5.00	36.4	22.0	2.80	300	—	—	—	..
Tuckahoe	Tap, public supply	8/29/12	6	1	122	98	.002	.154	Trace	0.16	6.25	81.4	57.0	2.80	400	+	—	—	..
Tuckahoe	Tap, public supply	10/17/12	15	Trace	117	94	.006	.136	.001	0.24	6.25	85.7	63.0	1.60	400	+	—	—	..
Tuckahoe	Tap, public supply	12/16/12	20	Trace	98	77	.042	.146	.001	0.12	7.25	52.9	46.0	3.80	145,000	+	—	—	..
Tully	Tap, public supply	4/ 4/12	Trace	Clear	366	310	.004	.016	Trace	3.60	11.50	257.0	23.0	0.10	20	—	—	—	..
Tuxedo	Tap, public supply	1/25/12	10	Clear	38	24	.024	.110	.001	0.14	2.25	20.8	15.0	2.84	50	—	—	—	..
Tuxedo	Tap, public supply	2/29/12	Trace	Clear	30	21	.022	.096	Trace	0.08	2.25	19.5	15.0	2.20	210	+	—	—	..
Tuxedo	Tap, public supply	4/ 3/12	15	Trace	42	27	.006	.082	Trace	0.04	2.50	22.1	13.0	2.20	60	—	—	—	..
Tuxedo	Tap, public supply	10/ 3/12	10	Trace	49	31	.006	.066	.001	0.04	2.00	22.1	14.0	2.80	8,200	+	—	—	..
Tuxedo	Tap, public supply	11/ 8/12	10	Clear	38	27	.012	.112	.001	0.06	2.25	23.4	15.0	1.90	....	+	+	—	..
Unadilla	Tap, Kilkenny supply	2/ 1/12	Trace	Clear	34	21	.012	.030	Trace	0.50	0.50	19.5	14.0	0.80	170	+	—	—	..
Unadilla	Tap, Martin brook supply	2/ 1/12	Trace	Clear	37	29	.024	.038	Trace	0.60	0.25	18.2	15.0	0.90	300	+	+	—	..
Unadilla	Tap, Kilkenny supply	3/ 6/12	Trace	Clear	34	25	.008	.026	.001	0.30	0.75	20.8	9.0	1.00	230	+	—	—	..
Unadilla	Tap, Martin brook supply	3/ 6/12	5	Trace	44	35	.006	.028	.001	0.60	1.25	31.2	8.0	1.30	550	+	+	—	..
Unadilla	Tap, Kilkenny supply	4/12/12	5	Clear	34	22	.004	.022	Trace	0.08	0.50	14.3	7.0	0.60	100	—	—	—	..
Unadilla	Tap, Martin brook supply	4/12/12	10	5	33	25	.006	.054	Trace	0.24	1.00	16.9	16.0	1.70	300	+	+	—	..
Unadilla	Tap, Kilkenny supply	9/11/12	Trace	Clear	80	60	.002	.006	.001	0.80	1.25	37.7	34.0	0.10	400	—	—	—	..
Unadilla	Tap, Martin brook supply	9/11/12	12	2	80	60	.010	.094	.001	0.80	1.12	32.5	31.0	2.60	4,350	+	—	—	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	4/23/12	5	5	116	109	.002	.038	Trace	0.40	1.00	92.9	92.0	0.60	240	—	—	—	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	5/21/12	7	2	105	94	.006	.038	Trace	0.44	1.50	90.0	92.0	1.40	30	—	—	—	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	10/15/12	5	Trace	129	115	.004	.046	.002	0.40	1.25	105.8	94.0	1.70	110	+	—	—	..
Syracuse	Tap, State Institution for Feeble-Minded Children, public supply	11/13/12	5	Clear	127	105	.014	.076	.001	0.50	1.50	101.5	95.0	1.20	3,500	—	—	—	..
Tarrytown	Raw water	1/17/12	15	Trace	90	55	.028	.116	.001	0.26	6.25	40.3	30.0	1.80	80	+	—	—	..
Tarrytown	Effluents of high service filters	1/17/12	5	Clear	81	61	.020	.090	Trace	0.30	6.25	41.6	31.0	1.30	10	—	—	—	..
Tarrytown	Effluents of low service filters	1/17/12	....	....	....	....	....	....	....	....	....	....	....	....	20	—	—	—	..
Tarrytown	Raw water	2/21/12	15	5	99	80	.052	.152	.003	0.30	6.00	42.9	31.0	2.90	180	—	—	—	..
Tarrytown	Effluents of high service filters	2/21/12	10	3	94	78	.024	.110	.003	0.26	6.00	44.3	31.0	2.50	120	—	—	—	..
Tarrytown	Effluents of low service filters	2/21/12	....	....	....	....	....	....	....	....	....	....	....	....					
Tarrytown	Raw water	3/27/12	5	5	102	86	.032	.110	.001	0.48	6.00	45.7	25.0	1.30	30	—	—	—	..
Tarrytown	Effluents of high service filters	3/27/12	....	....	....	....	....	....	....	....	....	....	....	....	375	+	+	—	..
Tarrytown	Effluents of low service filters	3/27/12	Trace	Clear	83	62	.034	.078	Trace	0.48	6.00	44.3	24.0	0.90	50	—	—	—	..
Tarrytown	Raw water	5/ 3/12	15	5	105	86	.022	.128	.001	0.40	5.62	47.1	25.0	1.80	170	—	—	—	..
Tarrytown	Effluents of high service filters	5/ 3/12	Trace	Clear	99	76	.002	.046	Trace	0.40	5.00	37.7	21.0	2.50	500	+	—	—	..
Tarrytown	Effluents of low service filters	5/ 3/12	....	....	....	....	....	....	....	....	....	....			25	[illegible]			
Tarrytown	Tap, outlet of main	8/ 5/12	....	....	....	....	....	....	....	....	....	....							
Tarrytown	Raw water (East View)	8/28/12	15	2	100	76	.040	[illegible]	....										
Tarrytown	Tap, high service (East View)	8/28/12	Trace	Clear	[illegible]														
Tarrytown	Tap, low service (East View)	[illegible]																	
Tarrytown	Raw water																		
Tarrytown	Effluents [illegible]																		

Theresa	Tap, public supply	9/ 9/12	25	Trace	119	94	.002	.092	Trace	0.16	2.12	60.0	59.0	3.90	25,000	+	+	−	..
Theresa	Tap, public supply	10/26/12	30	Clear	104	82	.032	.184	Trace	0.10	2.25	67.1	62.0	6.00	120	+	−	−	..
Theresa	Tap, public supply	12/ 9/12	45	10	81	55	.024	.108	Trace	0.24	1.15	39.0	35.0	10.40	12,500	+	+	+	..
Ticonderoga	Tap, public supply	1/ 3/12	5	5	36	27	.016	.066	.001	0.04	0.75	24.7	23.0	1.20	30	−	−	−	..
Ticonderoga	Tap, public supply	2/ 6/12	10	3	40	27	.006	.050	Trace	0.04	1.00	26.0	21.0	1.10	30	+	−	−	..
Ticonderoga	Tap, public supply	3/12/12	Trace	Clear	30	26	.010	.068	Trace	0.06	1.00	26.0	24.0	1.30	40	−	−	−	..
Ticonderoga	Tap, public supply	4/16/12	Trace	Clear	55	35	.010	.040	Trace	Trace	0.75	24.7	21.0	1.20	80	−	−	−	..
Ticonderoga	Tap, public supply	9/ 4/12	Trace	7	60	40	.008	.038	.001	0.04	1.00	28.6	25.0	1.50	60	+	−	−	..
Ticonderoga	Tap, public supply	10/22/12	10	15	44	35	.004	.088	Trace	0.04	1.00	29.9	24.0	1.70	90	+	+	−	..
Ticonderoga	Tap, public supply	12/ 3/12	15	3	96	68	.008	.088	Trace	0.14	1.00	57.1	56.0	2.70	600	+	−	−	..
Tonawanda	Tap, public supply	1/24/12	5	15	151	121	.026	.068	.002	0.10	8.00	111.4	99.0	1.20	200	+	−	−	..
Tonawanda	Tap, public supply	3/ 8/12	10	5	132	110	.014	.061	Trace	0.10	7.00	105.8	98.0	0.90	130	+	−	−	..
Tonawanda	Tap, public supply	4/20/12	10	10	139	122	.004	.032	.003	0.06	7.00	100.0	89.0	0.90	500	+	−	−	..
Tonawanda	Tap, public supply	9/19/12	5	1	166	132	.002	.084	.001	0.04	7.50	100.0	93.0	1.50	7,200	+	+	−	..
Tonawanda	Tap, public supply	11/22/12	10	30	174	152	.014	.098	Trace	0.06	7.75	105.8	96.0	2.60	300	+	+	−	..
Troy	Tap, public supply	2/ 7/12	10	Trace	53	32	.062	.108	.001	0.40	1.75	31.2	24.0	2.40	190	+	+	−	..
Troy	Tap, low service	2/ 7/12	20	Trace	68	51	.020	.094	Trace	0.50	2.25	39.0	27.0	3.20	200	+	+	−	..
Troy	Tap, high service	4/ 4/12	15	15	70	58	.020	.084	.001	0.40	1.50	33.8	23.0	2.90	2,300	+	+	+	..
Troy	Tap, low service	4/ 4/12	20	30	76	61	.130	.136	.062	0.40	1.75	28.6	19.0	4.30	2,700	+	+	−	..
Troy	Tap, high service	5/14/12	8	10	94	67	.006	.114	.001	0.40	1.50	24.7	19.0	3.10	250	+	−	−	..
Troy	Tap, low service	5/14/12	10	10	109	80	.016	.134	.001	0.06	2.00	50.0	33.0	3.20	180	+	−	−	..
Tro	Tap, high service	6/ 4/12	7	18	76	45	.012	.130	.001	0.36	2.25	32.5	27.0	3.30	275	+	+	+	..
Troy	Tap, low service	6/ 4/12	10	35	69	47	.018	.222	.001	0.20	2.25	40.3	33.0	4.80	700	+	+	+	..
Troy	Tap, high service	10/22/12	15	10	68	42	.076	.192	.002	0.14	1.50	35.1	25.0	3.60	3,300	+	+	−	..
Troy	Tap, low service	10/22/12	15	10	76	45	.036	.194	.002	0.26	1.50	42.9	22.0	4.30	150	+	−	−	..
Troy	Tap, low service	12/17/12	15	5	68	53	.128	.120	.003	0.40	2.25	36.4	30.0	3.80	90	−	−	−	..
Troy	Tap, high service	12/17/12	35	5	58	27	.022	.120	Trace	0.24	2.50	27.3	16.0	6.20	250	+	−	−	..
Tuckahoe	Tap, public supply	1/19/12	10	5	112	95	.040	.118	.004	1.20	7.12	41.6	37.0	3.00	25,000	+	−	−	..
Tuckahoe	Tap, public supply	2/23/12	10	5	107	73	.080	.152	.005	1.20	8.00	50.0	29.0	4.00	325	−	−	−	..
Tuckahoe	Tap, public supply	3/27/12	15	5	103	60	.124	.136	.003	0.72	5.50	35.1	20.0	3.50	800	+	−	−	..
Tuckahoe	Tap, public supply	5/ 4/12	15	5	81	60	.012	.124	.003	0.72	5.00	36.4	22.0	2.80	300	−	−	−	..
Tuckahoe	Tap, public supply	8/20/12	6	1	122	98	.002	.154	Trace	0.16	6.25	81.4	57.0	2.80	400	+	−	−	..
Tuckahoe	Tap, public supply	10/17/12	15	Trace	117	94	.006	.136	.001	0.24	6.25	85.7	63.0	1.60	400	+	−	−	..
Tuckahoe	Tap, public supply	12/16/12	20	Trace	98	77	.042	.146	.001	0.12	7.25	52.9	46.0	3.80	145,000	+	−	−	..
Tully	Tap, public supply	4/ 4/12	Trace	Clear	366	310	.004	.016	Trace	3.60	11.50	257.0	23.0	0.10	20	−	−	−	..
Tuxedo	Tap, public supply	1/25/12	10	Clear	38	24	.024	.110	.001	0.14	2.25	20.8	15.0	2.84	50	−	−	−	..
Tuxedo	Tap, public supply	2/29/12	Trace	Clear	30	21	.022	.096	Trace	0.08	2.25	19.5	15.0	2.20	210	+	−	−	..
Tuxedo	Tap, public supply	4/ 3/12	15	Trace	42	27	.006	.082	Trace	0.04	2.50	22.1	13.0	2.20	60	−	−	−	..
Tuxedo	Tap, public supply	10/ 3/12	10	Trace	49	31	.006	.066	.001	0.04	2.00	22.1	14.0	2.80	8,200	+	−	−	..
Tuxedo	Tap, public supply	11/ 8/12	10	Clear	38	27	.012	.112	.001	0.06	2.25	23.4	15.0	1.90	....	+	+	−	..
Unadilla	Tap, Kilkenny supply	2/ 1/12	Trace	Clear	34	21	.012	.030	Trace	0.50	0.50	19.5	14.0	0.80	170	+	−	−	..
Unadilla	Tap, Martin brook supply	2/ 1/12	Trace	Clear	37	29	.024	.038	Trace	0.60	0.25	18.2	15.0	0.90	300	+	+	−	..
Unadilla	Tap, Kilkenny supply	3/ 6/12	Trace	Clear	34	25	.008	.026	.001	0.30	0.75	20.8	9.0	1.00	230	+	−	−	..
Unadilla	Tap, Martin brook supply	3/ 6/12	5	Trace	44	35	.006	.028	.001	0.60	1.25	31.2	8.0	1.30	550	+	+	−	..
Unadilla	Tap, Kilkenny supply	4/12/12	5	Clear	34	22	.004	.022	Trace	0.08	0.50	14.3	7.0	0.60	100	−	−	−	..
Unadilla	Tap, Martin brook supply	4/12/12	10	5	33	25	.006	.054	Trace	0.24	1.00	16.9	16.0	1.70	300	+	+	−	..
Unadilla	Tap, Kilkenny supply	9/11/12	Trace	Clear	80	60	.002	.006	.001	0.80	1.25	37.7	34.0	0.10	400	−	−	−	..
Unadilla	Tap, Martin brook supply	9/11/12	12	2	80	60	.010	.094	.001	0.80	1.12	32.5	31.0	2.60	4,350	+	−	−	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

ITY, TOWN R VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
dilla	Tap, Kilkenny supply	10/25/12	5	Trace	57	47	.012	.100	Trace	0.04	1.00	29.9	29.0	1.70	850	+	+	+	..
dilla	Tap, Martin brook supply	10/25/12	10	Trace	53	38	.008	.112	Trace	0.04	1.00	28.6	24.0	1.70	275	+	+	+	..
dilla	Tap, Kilkenny supply	12/ 7/12	10	Trace	32	22	.006	.040	Trace	0.12	1.50	19.5	10.0	2.00	400	—	—	—	..
dilla	Tap, Martin brook supply	12/ 7/12	20	45	47	36	.016	.126	Trace	0.16	0.75	15.6	8.0	5.40	13,000	+	+	+	..
on	Tap, public supply	2/ 9/12	Trace	Clear	264	238	.010	.014	Trace	0.08	38.75	195.0	157.0	0.40	40	+	—	—	..
on	Tap, public supply	3/19/12	Trace	5	146	126	.010	.008	Trace	0.48	9.75	120.0	105.0	0.20	750	—	—	—	..
on	Tap, public supply	4/29/12	5	5	216	187	.002	.022	.001	0.34	29.25	140.0	120.0	0.30	180	—	—	—	..
on	Tap, public supply	9/26/12	Trace	Clear	152	139	.002	.014	.001	0.60	16.50	78.3	70.0	0.70	450	+	+	—	..
on	Tap, public supply	11/ 1/12	5	Trace	133	120	.012	.048	.001	0.60	14.25	85.8	78.0	0.40	1,000	+	+	—	..
on	Tap, public supply	11/29/12	Trace	Trace	243	216	.014	.028	Trace	0.34	53.00	125.8	118.0	0.60	20	—	—	—	..
on	Tap, public supply	12/28/12	Trace	Clear	78	67	.020	.028	Trace	1.20	2.00	16.9	13.0	0.40	3,300	—	—	—	..
er Jay	Brook, proposed source, public supply	12/ 7/12	20	Trace	40	26	.004	.082	Trace	0.60	0.75	22.1	6.0	6.00	590	+	—	—	..
a	Tap, southern watershed supply	2/16/12	15	10	121	63	.020	.088	Trace	0.30	0.62	50.0	44.0	2.80	30	—	—	—	..
a	Tap, West Canada creek supply	2/16/12	25	Clear	63	37	.032	.070	.001	0.48	0.50	24.7	18.0	3.00	30	—	—	—	..
a	Tap, southern watershed supply	3/23/12	15	5	85	64	.030	.080	Trace	0.24	1.25	60.0	50.0	3.30	2,000	+	+	—	..
a	Tap, West Canada creek supply	3/23/12	15	Clear	41	27	.030	.054	Trace	0.40	0.50	22.1	18.0	4.10	250	+	—	—	..
a	Tap, State Hospital	5/ 8/12	Trace	Clear	277	243	.002	.012	.001	1.60	5.25	188.6	173.0	0.40	850	—	—	—	..
a	Tap, southern watershed supply	4/27/12	15	5	66	50	.008	.096	.002	0.16	1.00	41.6	.....	2.80	1,000	+	—	—	..
a	Tap, West Canada creek supply	4/27/12	25	Trace	26	19	.008	.086	Trace	0.26	0.50	15.6	6.0	4.70		+			
a	Tap, southern watershed supply	6/20/12	10	10	107	85	.006	.074	.001	0.14	0.50	[illegible]							
a	Tap, West Canada creek supply	6/20/12	20	1	42	24	.006	.078	.001	[illegible]									
a	Tap, southern watershed supply	9/12/12	2	1	135	113	[illegible]												
a	Tap, West Canada creek supply	9/12/12	37	[illegible]															
a	Tap, southern watershed supply	[illegible]																	
	Tap, West Canada [illegible]																		

Valatie	Tap, public supply	12/14/12	20	C	79	63	.024	.128	.001	0.16	2.25	42.9	33.0	5.40	100	+	−	−	..
Victor	Tap, public supply	1/13/12	Clear	Ty	403	423	.014	.020	Trace	1.60	5.37	257.0	228.0	0.20	10	−	−	−	..
Victor	Tap, public supply	2/22/12	Trace	Clear	417	362	.004	.012	.001	1.80	4.75	250.0	200.0	0.60	300	+	−	−	..
Victor	Tap, public supply	4/ 2/12	5	Clear	398	334	.008	.022	.011	1.70	4.25	285.5	200.0	0.60	1,200	−	−	−	..
Victor	Tap, public supply	10/ 9/12	Trace	Clear	543	450	.004	.026	Trace	2.00	4.75	351.0	229.0	0.30	1,100	−	−	−	..
Victor	Tap, public supply	11/27/12	Trace	Clear	450	398	.004	.02[illegible]	Trace	3.20	5.00	328.5	223.0	0.40	200	−	−	−	..
Victor	Tap, public supply	12/31/12	Trace	Clear	440	......	.032	.022	Trace	1.80	5.50	228.5	220.0	0.30	90	−	−	−	..
Voorheesville	Tap, public supply	2/ 3/12	Trace	3	173	158	.020	.032	Trace	0.50	1.25	125.8	120.0	0.50	375	+	+	−	..
Voorheesville	Tap, public supply	3/29/12	10	10	155	135	.006	.034	Trace	0.34	1.25	98.6	89.0	1.20	200	+	−	−	..
Voorheesville	Tap, public supply	4/18/12	10	10	148	128	.002	.028	Trace	0.24	1.25	91.4	82.0	1.00	300	+	+	−	..
Voorheesville	Tap, public supply	11/ 2/12	5	15	192	162	.006	.092	.001	0.70	1.50	128.6	121.0	2.00	350	+	−	−	..
Voorheesville	Tap, public supply	12/28/12	5	Clear	193	182	.014	.044	Trace	0.44	2.00	134.2	124.0	1.20	30	−	−	−	..
Walden	Tap, public supply	3/ 1/12	Trace	Clear	197	186	.026	.018	.001	1.20	3.25	122.8	121.0	0.20	10	−	−	−	..
Walden	Tap, public supply	4/ 5/12	Trace	Trace	335	274	.006	.006	Trace	5.20	9.75	182.8	143.0	0.20	80	+	+	−	..
Walden	Tap, public supply	10/ 4/12	5	Clear	231	193	.004	.014	Trace	0.60	4.00	100.0	160.0	1.20	90	+	+	−	..
Walden	Tap, public supply	11/ 9/12	Trace	Clear	228	186	.010	.030	Trace	1.00	1.25	148.6	142.0	0.30	110	−	−	−	..
Walden	Tap, public supply	12/28/12	Trace	Clear	248	195	.014	.030	.001	1.00	5.50	180.0	144.0	0.40	475	+	−	−	..
Walton	Tap, public supply	3/10/12	10	Clear	42	26	.022	.078	.001	0.80	1.62	16.9	10.0	1.60	2,700	+	−	−	..
Walton	Tap, public supply	4/12/12	10	Clear	41	23	.008	.026	Trace	0.08	1.00	15.6	9.0	1.10	200	+	−	−	..
Walton	Tap, public supply	10/11/12	10	3	48	32	.004	.040	.001	0.24	1.00	24.7	20.0	2.00	2,300	+	−	−	..
Walton	Tap, public supply	11/14/12	10	5	43	31	.004	.066	.001	0.54	.50	19.5	10.0	2.10	350	+	+	−	..
Warrensburg	Big brook	1/ 4/12	25	Trace	43	35	.022	.048	Trace	0.20	1.37	12.7	7.0	3.70	170	+	−	−	..
Warrensburg	Middle brook	1/ 4/12	......	......	......	......	......	......	......	......	......	......	......	......	120	+	−	−	..
Warrensburg	Harrington brook	1/ 4/12	......	......	......	......	......	......	......	......	......	......	......	......	160	+	−	−	..
Warrensburg	Tap, public supply	1/ 4/12	......	......	......	......	......	......	......	......	......	......	......	......	130	+	−	−	..
Warrensburg	Tap, public supply	1/31/12	10	Clear	50	30	.024	.044	.001	0.30	0.37	18.2	13.0	2.40	40	+	−	−	..
Warrensburg	Tap, public supply	3/13/12	10	Clear	41	31	.008	.048	Trace	0.30	0.37	19.5	2.0	2.50	70	+	−	−	..
Warrensburg	Tap, public supply	9/19/12	35	Trace	58	33	.004	.094	.001	0.06	0.75	22.1	14.0	3.80	1,300	+	+	−	..
Warsaw	Tap, public supply	1/17/12	5	5	150	119	.008	.022	Trace	2.80	4.50	80.0	73.0	0.50	30	+	−	−	..
Warsaw	Tap, public supply	3/11/12	5	Clear	167	140	.012	.060	.001	0.90	2.50	114.2	113.0	0.20	375	+	−	−	..
Warsaw	Tap, public supply	3/30/12	20	5	121	98	.030	.106	.001	0.78	2.00	85.8	84.0	3.90	1,500	+	+	−	..
Warsaw	Tap, public supply	9/27/12	10	Trace	200	178	.004	.088	.001	0.60	2.50	142.8	123.0	3.50	450	+	+	−	..
Warsaw	Tap, public supply	11/20/12	15	1	173	148	.018	.104	Trace	0.60	2.50	122.8	114.0	4.10	800	+	−	−	..
Warwick	Tap, public supply	1/25/12	2	Trace	69	60	.024	.056	.001	0.30	1.50	47.1	43.0	0.60	600	−	−	−	..
Warwick	Tap, public supply	4/ 3/12	10	25	67	52	.022	.088	.001	0.14	1.00	28.6	23.0	1.30	400	+	+	−	..
Warwick	Tap, public supply	12/28/12	10	Trace	70	56	.012	.058	.001	0.04	2.00	50.0	43.0	1.60	300	−	−	−	..
Washingtonville	Tap, public supply	2/29/12	10	10	53	35	.056	.106	.001	0.24	1.50	20.8	17.0	3.50	18,000	+	+	−	..
Washingtonville	Tap, public supply	4/ 5/12	15	Trace	42	32	.006	.080	.001	0.16	1.50	19.5	14.0	2.20	5,000	+	+	−	..
Washingtonville	Tap, public supply	8/19/12	23	8	83	65	.002	.096	Trace	0.14	2.62	62.9	58.0	3.40	550	+	+	−	..
Washingtonville	Tap, public supply	10/ 5/12	10	15	86	74	.012	.120	Trace	0.10	2.00	48.6	48.0	2.80	33,000	+	+	−	..
Washingtonville	Tap, public supply	11/11/12	3	Trace	70	60	.010	.072	.001	0.08	1.75	27.3	23.0	1.90	....	+	+	−	..
Waterford	Tap, public supply	1/18/12	25	5	107	66	.040	.108	.002	0.20	2.12	60.0	36.0	25.20	700	+	+	+	..
Waterford	Tap, public supply	2/ 8/12	20	5	117	81	.032	.098	.001	0.20	1.75	44.3	39.0	24.40	475	+	+	+	..
Waterford	Tap, public supply	3/14/12	20	370	109	69	.028	.514	.007	0.14	2.00	50.0	39.0	30.80	66,500	+	+	+	..
Waterford	Tap, public supply	4/25/12	35	10	51	31	.002	.100	Trace	0.14	0.25	16.0	14.0	18.40	1,000	+	+	+	..
Waterford	Tap, public supply	9/20/12	45	10	127	78	.008	.140	.002	0.14	2.00	61.4	43.0	18.40	700	+	+	+	..
Waterford	Tap, public supply	11/ 4/12	50	5	105	63	.024	.156	.001	0.04	1.50	41.6	31.0	17.20	750	+	+	+	..
Waterloo	Tap, public supply	2/12/12	Trace	Clear	251	222	.040	.084	Trace	0.40	60.00	114.2	112.0	1.20	....	....	....	....	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (Continued)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Waterloo	Tap, public supply	3/20/12	25	12	167	136	.038	.218	.002	0.36	29.00	77.1	68.0	6.40	5,300	+	+	+	..
Waterloo	Tap, public supply	10/ 9/12	10	20	276	188	.010	.180	.003	0.26	60.00	108.6	102.0	1.30	2,000	+	+	+	..
Waterloo	Tap, public supply	11/26/12	5	Trace	247	220	.044	.096	.004	0.36	61.00	111.4	105.0	1.90	1,900	+	+	+	..
Waterloo	Tap, public supply	12/30/12	5	20	258	228	.030	.092	.002	0.36	61.00	114.2	103.0	3.50	4,100	+	—	—	..
Watertown	Tap, public supply	1/10/12	10	10	96	67	.018	.050	Trace	0.20	1.00	39.0	6.0	10.00	30	—	—	—	..
Watertown	Tap, public supply	3/ 1/12	Trace	Clear	78	57	.006	.030	Trace	0.24	2.25	36.4	15.0	8.00	20	—	—	—	..
Watertown	Tap, public supply	4/24/12	Trace	Clear	56	38	.010	.048	.001	0.24	0.50	29.9	8.0	1.90	80	—	—	—	..
Watertown	Tap, public supply	9/ 9/12	20	Trace	110	74	.012	.042	Trace	0.08	2.00	57.8	16.0	9.60	10	—	—	—	..
Watertown	Tap, public supply	10/26/12	40	Clear	104	70	.032	.180	Trace	0.08	1.75	50.0	23.0	15.20	200	—	—	—	..
Watertown	Tap, public supply	12/ 7/12	Trace	Clear	85	78	.014	.066	.001	0.24	1.50	57.1	18.0	4.00	50	—	—	—	..
Waterville	Tap, public supply	2/19/12	18	8	74	64	.024	.050	Trace	0.24	0.50	53.6	31.0	3.09	80	+	—	—	..
Waterville	Tap, public supply	5/ 2/12	15	15	51	30	.002	.066	Trace	0.14	0.50	22.1	16.0	1.50	200	—	—	—	..
Waterville	Tap, public supply	10/24/12	15	5	111	98	.014	.124	Trace	0.08	0.75	74.3	65.0	3.30	400	—	—	—	..
Watervliet	Tap, public supply	1/10/12	25	30	185	153	.044	.172	.004	0.80	4.12	82.9	73.0	4.40	1,600	+	+	—	..
Watervliet	Tap, public supply	1/29/12	15	7	155	141	.122	.092	.003	0.60	5.00	105.8	84.0	2.54	275	+	+	+	..
Watervliet	Tap, public supply	2/ 6/12	15	5	160	128	.144	.118	.004	0.50	5.25	102.8	90.0	4.40	475	+	+	+	..
Watervliet	Tap, public supply	3/ 5/12	20	10	141	90	.092	.066	.007	0.68	5.00	78.6	72.0	4.60	850	+	+	+	..
Watervliet	Tap, public supply	3/20/12	15	120	135	102	.034	.150	.004	0.32	2.75	87.1	40.0	5.80	6,600	+	+	+	..
Watervliet	Tap, public supply	4/ 3/12	20	50	123	90	.052	.130	.004	0.22	1.75	52.9	45.0	5.00	4,800	+	+	+	..
Watervliet	Tap, public supply	5/13/12	22	30	127	88	.012	.162	.001	0.34	2.50	60.0	55.0						
Watervliet	Tap, public supply	6/13/12	17	20	130	97	.016	.098	.001										
Watervliet	Tap, public supply	7/12/12	30	5	165	134	.026												
Watervliet	Raw water, public supply	10/22/12	22	25															

Watkins	Tap, public supply	4/23/12	Trace	Clear	200	190	.004	.054	.001	0.26	52.50	108.6	101.0	0.10	650	—	—	—	..
Watkins	Tap, public supply	10/ 8/12	5	Clear	241	210	.006	.054	.001	0.26	54.00	135.0	110.0	1.40	2,200	—	—	—	..
Watkins	Tap, public supply	11/27/12	5	Clear	248	217	.008	.072	Trace	0.26	59.00	151.4	107.0	1.40	70	+	—	—	..
Waverly	Tap, public supply	1/ 9/12	15	25	100	73	.028	.142	.001	0.50	2.25	47.1	29.0	2.90	250	+	—	—	..
Waverly	Tap, public supply	2/14/12	......	......	......	......	......	......	......	......	......	......	......	......	10	—	—	—	..
Waverly	Tap, public supply	3/29/12	20	80	106	63	.046	.158	.001	0.34	1.75	27.3	14.0	4.90	28,500	+	+	+	..
Waverly	Tap, public supply	4/24/12	30	10	70	47	.028	.148	.002	0.36	1.75	24.7	18.0	3.90	1,600	+	—	—	..
Waverly	Tap, public supply	10/31/12	15	5	66	46	.044	.156	.001	0.06	1.50	45.7	30.0	3.10	100	+	—	—	..
Waverly	Tap, public supply	12/28/12	15	15	83	62	.036	.104	.001	0.14	1.50	46.8	30.0	3.00	425	+	—	—	..
Wayland	Tap, public supply	1/ 6/12	Trace	Clear	161	129	.010	.018	Trace	2.00	3.00	111.4	106.0	0.10	45	—	—	—	..
Wayland	Tap, public supply	2/15/12	Trace	Clear	187	144	.024	.022	Trace	2.40	5.00	125.8	115.0	0.70	30	—	—	—	..
Wayland	Tap, public supply	3/23/12	Trace	Clear	169	148	.006	.024	Trace	2.60	4.25	108.6	108.0	0.40	110	—	—	—	..
Wayland	Tap, public supply	10/ 3/12	5	Clear	202	158	.004	.012	.001	0.50	3.25	128.6	123.0	0.10	70	—	—	—	..
Wayland	Tap, public supply	11/25/12	Trace	Clear	192	160	.010	.024	.001	2.00	3.25	140.0	125.0	0.20	900	—	—	—	..
Webster	Tap, public supply	2/16/12	Trace	Clear	326	271	.010	.028	Trace	4.00	6.75	264.5	214.0	0.70	130	+	—	—	..
Webster	Tap, public supply	3/ 9/12	Trace	Clear	292	244	.006	.018	Trace	3.60	6.25	243.0	197.0	0.70	10,500	+	—	—	..
Webster	Tap, public supply	4/22/12	Trace	Clear	244	206	.010	.022	.001	1.80	6.00	200.0	161.0	0.10	70	—	—	—	..
Webster	Tap, public supply	11/21/12	Trace	Clear	330	......	.018	.038	Trace	3.00	7.00	271.5	220.0	0.60	2,800	—	—	—	..
Weedsport	Tap, public supply	1/12/12	5	12	59	38	.192	.072	.003	0.80	0.75	29.9	18.0	2.00	16,000	+	—	—	..
Weedsport	Tap, public supply	2/20/12	Trace	Clear	1,466	1,386	.024	.038	Trace	0.26	4.75	900.0	265.0	0.48	20	—	—	—	..
Weedsport	Tap, public supply	3/23/12	Trace	Clear	634	569	.018	.036	Trace	2.40	2.75	393.0	220.0	0.50	170	+	—	—	..
Weedsport	Tap, public supply	4/26/12	Trace	Clear	605	497	.004	.016	Trace	1.60	2.75	371.5	230.0	0.90	90	+	—	—	..
Weedsport	Tap, public supply	10/11/12	5	Clear	787	724	.004	.012	Trace	1.20	2.50	600.0	239.0	1.30	11,000	+	+	—	..
Weedsport	Tap, public supply	11/19/12	5	Trace	832	716	.014	.022	Trace	1.50	2.00	543.0	237.0	0.90	60	+	—	—	..
Weedsport	Tap, public supply	12/21/12	Trace	Clear	602	541	.018	.054	.001	1.20	2.50	393.0	227.0	1.20	2,500	+	+	—	..
Wellsburg	Tap, public supply	1/ 9/12	5	Trace	125	102	.018	.042	.001	0.60	4.25	71.4	70.0	0.40	40	+	—	—	..
Wellsburg	Tap, public supply	2/13/12	Trace	Clear	106	90	.010	.014	Trace	0.80	4.37	65.7	63.0	0.38	1,100	+	—	—	..
Wellsburg	Tap, public supply	3/29/12	Trace	Clear	100	77	.012	.042	.001	0.80	4.00	67.1	54.0	0.70	200	—	—	—	..
Wellsburg	Tap, public supply	4/24/12	Trace	Clear	108	85	.004	.022	.001	0.80	3.75	67.1	51.0	1.00	250	+	+	—	..
Wellsburg	Tap, public supply	10/31/12	Trace	Trace	116	94	.010	.032	.002	0.44	3.75	77.1	77.0	0.90	500	+	—	—	..
Wellsburg	Tap in pump station, well water, public supply	11/29/12	Trace	Clear	125	101	.010	.020	Trace	1.00	4.25	77.1	65.0	1.10	80	+	—	—	..
Wellsburg	Tap, Algazar Hotel, public supply	11/29/12	10	Clear	120	102	.010	.018	.001	1.00	4.75	88.6	77.0	0.80	......	...	...	...	..
Wellsburg	Tap, Dr. Loope's residence, public supply	11/29/12	......	......	......	......	......	......	......	......	......	......	......	......	10	—	—	—	..
Wellsville	Tap, public supply	1/20/12	15	18	177	147	.034	.072	.001	0.48	8.00	122.8	119.0	1.30	300	+	—	—	..
Wellsville	Tap, public supply	2/23/12	10	8	153	133	.046	.022	.001	0.52	7.62	108.6	108.0	1.00	475	+	+	—	..
Wellsville	Tap, public supply	4/13/12	15	Trace	166	150	.040	.024	.001	0.60	8.50	125.8	124.0	0.60	80	+	—	—	..
Wellsville	Tap, public supply	10/ 7/12	20	Trace	156	139	.042	.028	.001	0.80	6.50	108.6	107.0	1.60	10,500	+	+	—	..
Wellsville	Tap, public supply	11/21/12	12	5	149	134	.072	.056	Trace	0.60	6.50	102.8	102.0	1.40	20	—	—	—	..
West Carthage	Tap, public supply	2/13/12	Trace	Clear	171	146	.016	.084	Trace	0.40	1.25	137.2	134.0	2.90	150	+	—	—	..
West Carthage	Tap, public supply	3/17/12	10	Clear	154	143	.020	.086	Trace	0.48	1.00	140.0	133.0	2.40	100	+	—	—	..
West Carthage	Tap, public supply	4/22/12	Trace	Clear	151	127	.006	.038	.001	0.52	1.50	122.8	111.0	0.60	550	—	—	—	..
West Carthage	Tap, public supply	9/ 9/12	15	Clear	166	146	.062	.070	Trace	0.16	1.25	125.8	125.0	3.40	26,000	+	+	+	..
West Carthage	Tap, public supply	10/26/12	20	Clear	150	138	.020	.132	.005	0.30	1.00	122.8	122.0	3.00	1,200	+	+	+	..
West Carthage	Tap, public supply	12/ 9/12	5	Clear	138	120	.014	.078	.001	0.70	1.62	111.4	107.0	1.60	19,000	+	—	—	..
Westfield	Tap, public supply	3/ 7/12	10	Clear	105	86	.014	.045	Trace	0.40	1.50	77.1	65.0	1.70	60	+	—	—	..
Westfield	Tap, public supply	4/16/12	20	240	224	203	.006	.132	Trace	0.16	1.50	67.1	48.0	4.50	6,500	+	+	+	..

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Continued*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Westfield	Tap, public supply	9/21/12	15	5	167	153	.002	.032	.001	0.06	1.25	122.8	111.0	2.50	1,500	+	+	—	..
Westfield	Tap, public supply	11/8/12	15	25	139	111	.014	.086	.001	0.08	1.00	77.1	61.0	3.50	525	+	+	—	..
Westfield	Tap, public supply	12/11/12	10	Trace	114	99	.006	.026	Trace	0.16	1.50	74.3	65.0	1.80	100	+	—	—	..
West Haverstraw	Tap, New York State Hospital for Crippled Children	3/25/12	15	Clear	40	26	.010	.030	Trace	0.10	1.75	14.3	7.0	1.30	300	+	—	—	..
West Haverstraw	Tap, New York State Hospital for Crippled Children	4/27/12	35	Clear	43	28	.012	.056	Trace	0.04	2.00	18.2	10.0	3.50	20	—	—	—	..
West Haverstraw	Tap, New York State Hospital for Crippled Children	5/27/12	28	Clear	40	26	.004	.038	.001	0.10	2.00	12.7	12.0	1.70	20	—	—	—	..
West Haverstraw	Tap, New York State Hospital for Crippled Children	8/21/12	35	Clear	27	16	.004	.054	Trace	0.08	0.75	18.2	13.0	4.10	60	—	—	—	..
West Haverstraw	Tap, New York State Hospital for Crippled Children	10/21/12	15	Clear	65	50	.004	.044	Trace	0.10	2.87	29.9	24.0	1.20	150	—	—	—	..
Westport	Tap, public supply	1/5/12	Trace	Clear	79	71	.004	.018	Trace	0.20	1.00	57.1	50.0	0.40	40	+	—	—	..
Westport	Tap, public supply	2/7/12	Trace	Clear	84	65	.006	.022	Trace	0.24	0.50	57.1	57.0	0.30	20	—	—	—	..
Westport	Tap, public supply	3/12/12	Trace	Clear	95	86	.018	.028	Trace	0.50	0.75	62.9	60.0	0.60	200	—	—	—	..
Westport	Tap, public supply	4/17/12	Trace	Clear	77	63	.002	.006	Trace	0.08	0.75	54.3	50.0	0.30	10	—	—	—	..
Westport	Tap, public supply	5/9/12	Trace	Clear	84	64	.004	.022	Trace	0.10	0.75	44.3	44.0	0.70	55	—			
Westport	Tap, public supply	9/5/12	Trace	Clear	83	62	.002	.002	Trace	0.16	0.75	55.7	50.0						
Westport	Tap, public supply	10/23/12	5	Trace	93	84	.008	.052	Trace	0.20									
Westport	Tap, public supply	12/4/12	Trace	Clear	78	65	.010												
West Winfield	Tap, public supply	2/15/12	Trace	Clear															
West Winfield	Tap, public supply																		
West Winfield	Tap, public supply																		
Whitehall	Tap, public supply																		

White Plains	Tap, public supply	3/27/12	Trace	Clear	167	142	.006	.036	Trace	0.52	4.50	120.0	73.0	0.30	1,600	−	−	−
White Plains	Tap, public supply	5/ 4/12	1	3	180	149	.008	.038	Trace	0.50	4.25	111.4	75.0	0.70	20	+	−	−
White Plains	Tap, public supply	8/28/12	Trace	Clear	208	177	.002	.014	Trace	0.90	5.00	156.0	103.0	0.40	450	−	−	−
White Plains	Tap, public supply	10/16/12	Trace	Trace	173	147	.002	.038	Trace	0.80	5.00	122.8	83.0	0.50	200	−	−	−
White Plains	Tap, public supply	12/18/12	Trace	Clear	212	181	.018	.044	.001	0.80	5.25	142.8	101.0	1.00	425	−	−	−
Whitesboro	Tap, public supply	1/12/12	1	2	216	179	.072	.036	.004	1.50	4.75	160.0	146.0	1.10	140	+	+	−
Whitesboro	Tap, White's supply	1/12/12	12	Trace	67	46	.040	.080	.038	0.36	0.25	33.8	31.0	4.50	60	+	−	−
Whitesboro	Tap, West Canada creek supply	2/16/12	10	10	187	156	.010	.048	.001	1.80	4.50	145.8	139.0	1.40	400	+	+	−
Whitesboro	Tap, White's supply	2/16/12	25	Clear	66	49	.016	.052	Trace	0.40	0.50	26.0	20.0	3.60	30	−	−	−
Whitesboro	Tap, West Canada creek supply	3/23/12	2	3	161	121	.022	.050	.001	1.20	4.50	120.0	118.0	1.50	1,700	+	−	−
Whitesboro	Tap, White's supply	3/23/12	10	Clear	117	86	.038	.054	.001	0.40	1.00	61.4	59.0	3.10	850	+	−	−
Whitesboro	Tap, West Canada creek supply	4/29/12	20	5	181	156	.004	.056	.001	1.08	4.00	134.2	121.0	0.80	1,000	+	+	−
Whitesboro	Tap, White's supply	4/29/12	25	Clear	33	20	.006	.072	Trace	0.26	0.25	16.9	9.0	4.50	100	−	−	−
Whitesboro	Tap, West Canada creek supply	6/20/12	10	18	200	175	.006	.094	.002	1.40	4.75	174.2	141.0	2.92	325	+	+	+
Whitesboro	Tap, White's supply	6/20/12	15	3	90	78	.010	.114	Trace	0.06	0.50	77.1	75.0	3.00	30	+	−	−
Whitesboro	Tap, West Canada creek supply	10/22/12	10	10	236	190	.002	.130	.003	0.88	5.25	177.2	155.0	2.80	100	+	−	−
Whitesboro	Tap, White's supply	10/22/12	25	Trace	70	52	.010	.088	Trace	0.10	1.50	40.3	34.0	5.80	30	−	−	−
Whitesboro	Tap, West Canada Creek supply	12/ 3/12	10	5	215	177	.020	.052	.001	1.20	5.00	151.4	151.0	1.40	2,000	+	+	−
Whitesboro	Tap, White's supply	12/ 3/12	10	Trace	189	162	.020	.094	Trace	0.24	5.00	142.8	143.0	2.20	200	−	−	−
Whitesboro	Tap, West Canada creek supply	2/ 9/12	Trace	Clear	80	70	.016	.010	Trace	0.60	0.50	60.0	49.0	0.30	30	+	−	−
Whitney's Point	Tap, public supply	3/18/12	Trace	Clear	89	69	.010	.010	Trace	0.72	0.50	54.3	54.0	0.20	5,800	+	−	−
Whitney's Point	Tap, public supply	4/30/12	Trace	Clear	69	62	.004	.012	Trace	0.50	1.25	57.1	50.0	0.10	40	−	−	−
Whitney's Point	Tap, public supply	9/27/12	5	Clear	159	126	.004	.008	.001	0.88	1.25	100.0	75.0	1.10	350	+	−	−
Whitney's Point	Tap, public supply	10/31/12	Trace	Clear	81	72	.022	.084	.001	0.80	0.50	71.4	70.0	0.50	80	+	−	−
Whitney's Point	Tap, public supply	11/29/12	Trace	Trace	80	66	.024	.020	Trace	0.72	1.00	62.9	58.0	0.40	10	−	−	−
Whitney's Point	Tap, public supply	12/27/12	Trace	Clear	77	66	.012	.010	Trace	0.50	0.75	61.4	50.0	0.30	10	−	−	−
Williamsville	Tap, public supply	3/ 4/12	Trace	Clear	698	650	.006	.054	Trace	0.50	16.25	385.5	155.0	0.30	50	−	−	−
Williamsville	Tap, public supply	4/20/12	Trace	Clear	496	452	.004	.016	.004	0.60	11.75	357.0	136.0	0.70	30	+	−	−
Williamsville	Tap, public supply	9/19/12	Trace	Clear	791	698	.002	.022	.001	0.40	12.75	507.5	145.0	0.90	1,100	+	+	−
Williamsville	Tap, public supply	11/16/12	Trace	Clear	693	639	.008	.048	Trace	1.20	14.75	457.0	177.0	1.00	4,200	+	+	−
Williamsville	Tap, public supply	12/19/12	Trace	Clear	600	539	.020	.052	Trace	1.00	13.75	407.0	167.0	1.20	150	+	−	−
Windsor	Tap, public supply	1/30/12	Trace	Clear	38	31	.026	.046	Trace	0.08	1.00	24.7	21.0	0.40	30	−	−	−
Windsor	Tap, public supply	4/13/12	10	Clear	65	37	.002	.008	Trace	2.40	5.25	33.8	19.0	0.50	20	−	−	−
Windsor	Tap, public supply	10/11/12	5	Clear	59	40	.002	.034	Trace	0.04	1.25	39.0	14.0	2.20	70	+	−	−
Windsor	Tap, public supply	12/ 6/12	Trace	Clear	32	25	.010	.016	Trace	0.30	1.00	18.2	10.0	0.50	40	−	−	−
Worcester	Tap, public supply	2/ 2/12	Trace	Trace	33	23	.018	.078	Trace	0.04	1.25	12.7	6.0	1.80	30	+	−	−
Worcester	Tap, public supply	4/12/12	10	Trace	21	17	.026	.088	.001	0.06	0.75	16.9	6.0	1.90	300	−	−	−
Worcester	Tap, public supply	9/11/12	Trace	Clear	44	24	.002	.072	.001	0.04	0.75	11.1	6.0	1.50	80	−	−	−
Worcester	Tap, public supply	11/16/12	10	Clear	34	21	.012	.008	.001	0.04	1.00	11.1	4.0	2.50	170	+	−	−
Wurtsboro	Tap, public supply	1/27/12	Trace	Trace	44	23	.022	.062	.001	0.14	1.25	18.2	10.0	1.10	150	+	−	−
Wurtsboro	Tap, public supply	10/ 9/12	......	......	......	......	......	......	......	......	......	......	......	......	400	+	−	−
Wurtsboro	Tap, public supply	11/13/12	8	Trace	23	19	.020	.060	.001	0.04	0.75	18.2	9.0	2.00	1,500	+	−	−
Wyoming	Tap, public supply	1/17/12	5	Clear	259	230	.024	.032	Trace	4.40	1.75	195.0	181.0	0.40	10	−	−	−
Wyoming	Tap, public supply	3/11/12	Trace	Clear	254	198	.016	.047	Trace	2.80	1.75	185.8	182.0	0.10	30	−	−	−
Wyoming	Tap, public supply	9/28/12	Trace	Clear	315	284	.002	.004	.001	1.20	2.25	260.0	221.0	0.60	800	+	+	−
Wyoming	Tap, public supply	11/20/12	5	3	291	245	.012	.034	Trace	1.40	2.12	228.5	214.0	0.80	350	+	+	−
Yonkers	Raw water, public supply	1/19/12	10	5	132	112	.090	.042	.007	1.20	7.12	85.8	83.0	1.30	2,300	+	+	+
Yonkers	Purified water, public supply	1/19/12	5	Clear	164	144	.022	.028	Trace	1.20	8.25	97.1	83.0	0.70	10	−	−	−

ANALYTICAL RESULTS OF SAMPLES OF WATER — (*Concluded*)

CITY, TOWN OR VILLAGE	Source	Date	Color	Turbidity	Residue on evaporation	Mineral residue	Nitrogen as — Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Chlorine	Hardness. Total	Alkalinity	Oxygen consumed	Bacteria per c.c.	B. Coli Type (+=Present) (—=Absent) 10 c.c.	1 c.c.	1-10 c.c.	1-100 c.c.
Yonkers	Raw water, public supply	2/22/12	20	25	132	92	.210	.258	.007	0.90	6.50	64.3	52.0	3.90	....	+	+	+	..
Yonkers	Purified water, public supply	2/22/12	Trace	Clear	135	100	.098	.108	.002	1.08	7.00	75.7	64.0	2.50	40	—	—	—	..
Yonkers	Raw water, public supply	3/26/12	20	5	125	103	.064	.138	.002	0.90	4.25	60.0	36.0	2.00	3,800	+	+	+	..
Yonkers	Purified water, public supply	3/26/12	5	Clear	120	102	.014	.070	Trace	1.20	5.75	77.1	50.0	1.00	10	—	—	—	..
Yonkers	Tap, Grassy Sprain supply, public supply	5/ 6/12	15	Trace	75	52	.006	.084	.002	0.26	4.25	33.8	21.0	2.70	30	+	—	—	..
Yonkers	Raw water, public supply	8/29/12	......	......	......	......	......	......	......	......	......	......	......	......	1,500	+	+	—	..
Yonkers	Purified water, public supply	8/29/12	Trace	Clear	198	170	.004	.042	Trace	0.68	8.50	117.2	104.0	1.90	10	+	—	—	..
Yonkers	Tap, Grassy Sprain supply, public supply	8/29/12	......	......	......	......	......	......	......	......	......	......	......	......	100	+	—	—	..
Yonkers	Raw water, public supply	10/16/12	20	Clear	165	137	.012	.100	.003	0.30	10.20	114.2	114.0	2.60	600	+	+	—	..

DIVISION OF ENGINEERING

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REPORT OF THE CHIEF ENGINEER

Hon. Eugene H. Porter, M.A., M.D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:— I have the honor to submit herewith the annual report of the work of the Engineering Division for 1912.

Attention was called in my last annual report to the dominant importance of the protection of public water supplies. While sewage disposal is of great importance in general and is of necessity a prerequisite or a partial requisite in the protection of public water supplies it must, for the obvious reason that water supplies are subject to other contaminating influences than sewage alone, be of secondary importance to the question of water supply. Increasing attention has therefore continued to be given by the Engineering Division to the question of pure water supplies, and this has been the principal feature which marks the work of the Division for 1912, both as to the number of water supplies in the State that have been voluntarily or upon request investigated by the Engineering Division and as to the conserving of the purity of the water supplies of the State which are protected by rules and regulations enacted by the Department.

In the work of sewerage and sewage disposal there is nothing in the work of 1912 which deserves individual mention except perhaps the fact that during the year a number of sewage disposal plants have been constructed or were under construction, and that plans for some important sewage disposal projects have been presented to the Department for approval.

Concerning the actual work of the Division during 1912 with reference to its amount and classification, the records show that during the year some 2,163 matters were referred to the Division for investigation, report or other disposition, requiring the preparation and sending out of some 3,170 reports, letters or other forms of correspondence. Ninety-eight sets of sewer plans were examined, reported upon and permits issued; 23 other permits issued; 57 examinations relating to water supplies completed; 232 cases of stream pollution and public nuisances investigated and dis-

posed of; 16 investigations of sewerage and sewage ‹ pleted; 259 conferences held with the chief engin members of the staff, and some 33 lectures given engineering subjects.

In my last annual report a full review was pres work of the Engineering Division from 1907 to 1912, by a chart showing graphically the amount in seasc tion of the work in its various subdivisions. It was t able to again present this chart, extended to include t ing 1912, and from which it will be seen that the s in work shown in previous years has been maintaine passed during the past year. A full description of tl the significance of the information presented by described in my last report and will not be repeated. is referred however to that report in connection with of the chart to include the work during 1912.

The arrangement and classification of the materia the report of the Division for 1912 is the same as tha previous annual reports and corresponds to the unifo tion adopted for all lines of work by the Division.

Respectfully submitted,

THEODORE HORTO

Chief

SEWERAGE AND SEWAGE DISPOSAL

Date of permit	Location of sewer	Stream receiving sewage
Feb. 26.....	Yager, Ogden, Mersereau and Robinson streets.	Chenango river
Feb. 26.....	Seminary avenue and Lathrop street.........	Susquehanna river
Mar. 21.....	Fairview avenue...........................	Chenango river
April 29.....	Chapin street.............................	Susquehanna river
May 28.....	Starr avenue and Phelps street...............	Chenango river
June 13.....	Hanchett avenue...........................	Chenango river
June 29.....	Gaylord street and Riverside Drive...........	Susquehanna and Chenango rivers
July 17.....	Elm and West streets.......................	Chenango river
Aug. 8.....	Bevier and Willard streets...................	Chenango river
Aug. 24.....	Silver and Grand streets....................	Chenango river
Oct. 17.....	Seminary avenue, Chestnut and Worden streets.	Susquehanna and Chenango rivers

In addition to the above, plans for a comprehensive sewer system in the Downsville sewer district of the city of Binghamton tributary to the Lestershire system and for modifications of the latter sewer system were submitted for approval jointly by the common ccouncil of the city of Binghamton and the board of trustees of the village of Lestershire on January 9, 1912.

These plans were approved on January 17, 1912, and conditional permits allowing the discharge of sewage from the proposed sewers into the Susquehanna river were granted to the city and village authorities. These permits and the report on the examination of the plans follow.

ALBANY, N. Y., *January* 17, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for the proposed Binghamton-Lestershire intercepting sewer to take in the portion of Binghamton known as Downsville which plans were submitted to this Department for approval jointly by the common council of the city of Binghamton and the board of trustees of the village of Lestershire on January 9, 1912.

The plans provide for a comprehensive sanitary sewer system covering an area of some 140 acres in the northwestern section of the city of Binghamton known as Downsville which comprises about three-fourths of the western portion of sewer district "A" shown on the general sewer plan of the city dated October, 1908, recently filed with this Department.

The proposed sewers in this district vary in size from 8 inches to 27 inches in diameter and are to be constructed with slopes sufficiently steep to produce self-cleansing velocities in the sewers under ordinary conditions. Manholes are to be placed at all points of change of slope and alignment and flush tanks are to be installed at the upper ends of all lateral sewers in order to facilitate inspection, flushing and cleaning of the proposed sewer system in Downsville.

The plans have been carefully examined with respect to alignment, sizes, slopes and capacities and other features of a hydraulic and sanitary nature in connection with the proposed sewers and it is found that these sewers should be adequate as to sizes and capacities to satisfactorily care for the sanitary sewage of the district to be served by them provided that in the construction they be made sufficiently water tight to keep out excessive amounts of ground water.

It is proposed to convey the sewage to be collected by these sewers to the so-called Broad street outlet sewer of the village of Lestershire by means of a 27-inch intercepting sewer to be constructed with a slope of 0.07 per cent. The capacity of this latter sewer should be adequate to care for the future contribution of sanitary sewage from the district to be served by it inasmuch as it should be able to carry about 4 cubic feet per second when flowing half full if properly constructed and the rate of sewage contribution from the Downsville sewer district will probably never exceed 2.5 cubic feet per second.

ALBANY, N. `

EUGENE H. PORTER, M.D., *State Commissioner of Health,*

DEAR SIR: — I beg to submit the following report on t
plans for sewage disposal for the Western House of Ref
Albion, N. Y., submitted to this Department for approval b
tect on April 20, 1912.

The records of the Department show that the institutio
a sewer system and sewage disposal plant consisting of a s
aerating filters which were constructed during the sumn
plans approved by this Department. It appears that alt
disposal plant operated satisfactorily for a few years wh
new, of recent years aeration has not been used in connect
because it seemed to produce no advantageous results an
rapidly, so that the larger part of the time the sewage ha
flow around the beds into the stream without purification.

In 1907 the State Department of Health recommended, a
tion, certain changes in the existing disposal plant with
the nuisance created by its operation. In the fall of 1908 it
by you that a new plant in a new location be constructed.

The plans now submitted were prepared in the office of
Ware, State Architect, and comprise blue prints and draw
109, showing plan and details of disposal plant and siph
specifications covering the same.

The Western House of Refuge at Albion is situated abo
the center of the village in the northern part of the town
Erie canal and on a branch of Old Orchard creek, which
Lake Ontario at Point Breeze some nine miles north of Albio
with an unfiltered water supply taken from wells which for
water supply for the village of Albion. The works are
Albion Water Works Co.

The population of the institution, according to the estin
Architect, is approximately 260 and it is estimated that the
tion to be cared for at the institution is 360.

The plans show that it is proposed to intercept the exis
from the institution near the present disposal plant and to c
by gravity flow to a proposed manhole near the plant at the
posed single tube 6-inch invert siphon, by means of which
be carried under the Erie canal and conveyed to a manhole
disposal plant on the north side of the canal, a distance of

The manhole at the head of the siphon is to be provided
prevent clogging of the siphon by rags, sticks and other s
and an overflow to the existing sewer is also provided which
into service in case of clogging. A 4-inch water main connects
at the upper end and is to be used for the purpose of flushi
hole at the other end of siphon is also arranged so that th
flushed by gravity or pressure to the proposed sludge bed
plant. There is an average available head of nearly four f
upper and the lower end of the siphon which should be ade
for the assumed maximum flow of sewage.

It is proposed to treat the sewage from the institution in
posal plant to be located near a branch of Marsh creek about
of the Erie canal and about 1,000 feet from the institution. T
near the institution grounds and has a drainage area of ap
square mile at the disposal plant. The records of the Dep
show that any public water supplies are taken from the str
point.

The proposed sewage disposal plant is to consist of a settli
chamber with 4 plural alternating discharge siphons, 4 int
filters and a sludge bed. The settling tank is to be an open tan
square of the Dortmund type and is to be provided with

and outlets. The tank varies in depth from 3 feet 6 inches to 8 feet 6 inches and will have sufficient capacity to give an average period of detention of about 5½ hours when serving the present population and a detention of about 3½ hours when serving the ultimate population provided for on the basis of a daily flow of 100 gallons per capita. The tank is to be constructed with a hopper-shaped bottom for the retention and storage of sludge which is to be drawn off by gravity through a 6-inch sludge pipe to an adjacent sludge bed at regular intervals.

The settled sewage is to flow into the dosing chamber through a riser pipe and splash pans for the purpose of aerating the effluent before it is discharged into the sand filters. These filters are to have a total area of about .3 acres and are provided with distributing and underdrain systems. The beds vary in depth from 2¾ feet to 3 feet and will be required to operate at the rate of about 110,000 gallons per acre per day when serving the ultimate population on the usual assumptions as to per capita rate of sewage contribution.

The sludge bed which is to care for the sludge from the settling tank and overflow from the manhole at the lower end of the inverted siphon when this siphon is being flushed is to be 15′ x 30′ with a depth of filtering material of about 1 foot. The underdrains from the sludge bed are to discharge into the creek.

From our careful examination of the plans it appears that the proposed sewage disposal plant if properly constructed in accordance with the plans and operated with care and efficiency should furnish an effluent which may safely be discharged into the stream at the present time without objection. I would therefore recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

AUBURN

Plans for proposed sewer extensions in Swift street and Lake avenue in the city of Auburn were approved on April 17, 1912, and a conditional permit was granted to the common council which allows the discharge into Owasco outlet of sewage from the proposed sewers. The permit and the report on the examination of the plans are printed below.

ALBANY, N. Y., *April* 16, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sewer extensions in the city of Auburn, Cayuga county, one copy of which was submitted to this Department for approval on April 3, 1912. A duplicate copy of these plans was received April 15, 1912.

The plans show that it is proposed to construct sewer extensions in Swift street and Moravia street, now Lake avenue. These sewers are to vary in size from 8 inches to 15 inches in diameter and will be constructed with slopes sufficiently steep to produce self-cleansing velocities under ordinary conditions.

The proposed sewers are not within the sewer district served by the city sewage disposal plants and are to discharge into the Owasco Lake outlet through existing outfall sewer at the intersection of Genesee and Mechanic streets.

The plans have been carefully examined by the Engineering Division and it is found that the proposed sewers if properly constructed should be adequate as to size and capacities to care for the probable future contribution of sewage from the district to be served by them.

I would therefore recommend that the plans be approved and a permit be issued allowing the discharge of sewage to be collected by the proposed sewers into the Owasco Lake outlet on condition that whenever required by

the State Commissioner of Health complete plans satisfac
ment for the interception and treatment of the entire sar
city, or any portion of such sewage which is not cared for
plant, shall be prepared and submitted to this Departmen
that within the time stated in such requirements, the
or all of the works shown by such plans as may be spe
pleted and put in operation.

Respectfully submitte
THEODORE

PERMIT

Application having been duly made to the State Comm
as provided by section 77 of chapter 49 of the Laws of
Health Law," as amended by chapter 553 of the Laws of
chapter 45 of the Consolidated Laws, permission is hereby
mon council of the city of Auburn to discharge sewage
sewer extension in Swift street and Lake avenue into the
outlet near the intersection of Genesee and Mechanic
municipality of Auburn, in accordance with the plans
petition,under the following conditions:

1. That this permit shall be revocable at any time or
cation or change when in the judgment of the State
Health such revocation, modification or change shall be

2. That the issuance of this permit shall not be deem
way action by this Department on any future applica
made for permission to discharge additional sewage o
waters of this State.

3. That only sanitary or domestic sewage, and no
surface water from streets, roofs or other areas shall b
proposed sewers.

4. That whenever required by the State Commissioner
factory detailed plans for the interception and treatm
sanitary sewage of the city or of any portion of such se
by the sewage disposal plants now in operation shall
submitted to this Department for approval and that
limit stated in such requirement the construction of a
shown by such plans as may be specified shall be comp
operation.

EUGENE H. PORTE
State Commissio

April 17, 1912

AVON

Plans for sewer extensions and for a sewage disposal pla
a settling tank of the Imhoff type to treat the sewage of the
were submitted for approval on January 19, 1912. The plans
on March 4, 1912, and a conditional permit issued allowing
of effluent from the proposed sewage disposal plant into the Ge

On May 22, 1912, plans showing amendments to the plans
posal approved in March of this year were approved but
issued inasmuch as the amended plans were submitted in accor
requirements of the permit issued on March 4, 1912. The
examination of the plans and the permit issued are given belo

ALBANY, N. Y., *February* 23, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewage disposal works and for certain sewer extensions for the village of Avon in Livingston county, submitted by the sewer commissioners on January 19, 1912.

The records of the Department show that original plans for a system of sewers on the separate plan were approved on December 14, 1894. These plans did not provide for purification of the sewage to be collected by this system. Plans for a proposed sewer in Main street, to replace an old wooden sewer, were approved on December 11, 1901.

Plans for an extension in South Genesee street were submitted on November 16, 1907, and were approved on December 23, 1907, on condition that the report and plans of the sewer system of the village, as required by chapter 468 of the Laws of 1903, be submitted within one year from the date of the issuance of the permit on December 23, 1907, and on condition that complete plans for sewage disposal be also submitted within one year from that date.

Plans were received on June 22, 1910, for an extension in Wadsworth avenue. These plans did not comply with the requirements of the Department nor with those of the above permit. They were accordingly returned for revision. A petition from the sewer commissioners asking for an extension of time for meeting the requirements of the permit was received on October 8, 1910. On February 8, 1911, the plans were resubmitted and their approval recommended by this Division. They were approved on March 3, 1911, and a permit was issued allowing the discharge of sewage into the Genesee river on condition that plans of the complete sewer system should be filed with this Department and that plans for sewage disposal be submitted on or before February 1, 1912, and that the works for preliminary treatment shown by said plans be constructed and put in operation by October 1, 1912.

The plans now submitted were prepared by Charles C. Hopkins, consulting engineer, and comprise:

Report and specifications for sewage treatment works in duplicate.
Sheet of sewer profile in duplicate.
General plan of system (tracing and blue print).
Blue prints of sewage treatment works (in duplicate).

The report of the designing engineer states that the object of installing the disposal plant is to comply with the requirements of the State Department of Health. It also points out that a private sewer built prior to the construction of the public system, serving twenty-six houses, can be connected with the present system and be made tributary to the disposal works. This sewer also receives surface water from four catch basins near Genesee street, and it is proposed to construct a leaping weir so that only the dry weather flow of sewage will reach the disposal works.

It appears that in order to prevent all storm water from reaching the disposal works, the catch basins connected with this sewer should either be disconnected or the owners of property having house sewers connected with it should be required to connect such house sewers with the existing sanitary sewer in Main street.

The combined sewer in Main street could then be used for surface drainage alone.

No definite data as to the possible amount of sewage to be treated is submitted, but from observation made by the designing engineer it amounts to about 200,000 gallons per day.

The plant will consist of a settling tank of the Imhoff or Emscher type for preliminary treatment to be followed by sprinkling filters for final or complete treatment whenever such treatment shall be required in the future. When complete treatment is required, a dosing tank is to be built adjoining the settling tank and an automatic siphon will discharge through a system of pipes and spraying nozzles on to the surface of the sprinkling filters.

Eight beds, each 22 by 25 feet, with filtering materia averaging 5½ feet deep are to be installed.

The plan of the complete sewer system differs from this Department in 1894 in the following respects:

A sewer called "Old Main street sewer," mentioned report, is shown extending from its outlet below the pub a point 100 feet above Lacey street.

The "Southwest branch," extending from the second m sewer to River street and across to Dover street and W shown as an 8-inch pipe while on the 1894 plan it is 6 in

An irregular 6-inch sewer is shown extending from a ma street near the depot to a manhole in the middle of the two branches lead, one to manhole on Prospect street, lamphole in same block.

A proposed 6-inch sewer is shown extending from ma Maple and Rochester street., in indirect line to North street

North street is indicated with a proposed 6-inch sewe the 1894 plan.

High street is extended and connected with North stre The proposed 6-inch sewer is extended to the junction wit

Six-inch sewer on Temple street is shown brought junction with Clinton street.

Genesee street sewer is shown extended 1,700 feet. Si necting Genesee street with Wadsworth avenue (called Cen plan) has only one change of direction instead of two streets. A proposed 8-inch sewer is shown in the southe worth avenue, paralleling in part of its length and connectin in the present 6-inch sewer. A short 6-inch extension is south 150 feet from manhole in Stone alley.

The village of Avon is situated in the western part of on the Genesee river. It is provided with an unfiltered wa from Conesus lake and the works are controlled by the m village is provided with public sewer serving eight-tenths and discharging into the Genesee river. A private sewe below the Main street bridge and the public outlet sewe bridge, both within the municipality.

The present population of the village according to the en approximately 2,100. The present population of the portic to be served by the sewer extensions indicated on the approximately 400, its area approximately 50 acres, givi about 9 per acre. The increase in population of the v comparatively slow but steady. Based on observations of t estimated that the sewage contributed to the disposal plant gallons per day, giving 100 gallons per capita per day.

The plans provide for one outfall sewer which will discharge treatment just above a bridge crossing the Genesee river at t street, a distance of 0.7 miles from the center of the village.

The plans have been carefully examined with reference extensions and sewage disposal works. In connection with the design has been carefully studied with reference to alignme capacities, facilities for cleaning and inspection and flush features of a hydraulic or sanitary nature. In connection sewage disposal it has been studied with reference to gener efficiency of the sewage disposal plant as a whole, and of and practical operation of the individual structures, appu apparatus.

The extensions are 6-inch tile pipe laid on a maximum grade with a minimum grade of 1 per cent. This gives sufficient vel self-cleansing velocities. The alignments are all straight betw and a manhole is placed at each change of alignment. Manho at a maximum of 530 feet, the spacing in general being abou lamphole is located at the junction of the extension and the on High street and on Rochester street. Although the sewer s

lamphole on High street is to be deepened a manhole should be placed at this point to facilitate cleaning, and further, since the sewage flows in opposite directions from this point. A manhole should be substituted for the existing lamphole on Rochester street because of a change of grade and to facilitate cleaning. Flush tanks are placed at the upper end of each extension.

It is proposed to treat the sewage collected by the system in a disposal plant located upon the northwestern side of the village on the Brandt estate, about 500 feet from the Genesee river. The stream is not used for water supply by any municipality or corporation below the sewer outlet.

The site of the plant is close to Main street, practically within the village, but as development seems to be away from the river there is little reason to anticipate any objection to the location of the plant at this point. The sewage can be intercepted at the second manhole on the old system, involving no expense for the construction of a trunk sewer. The plant is located at a considerable elevation above the stream and at a point sufficiently below the point of interception to allow its operation by gravity flow. The lands recommended by the engineer to be purchased are sufficient to allow future enlargement.

The sewage is entirely domestic. The sewage will be fresh as it reaches the plant. The tank is of the Imhoff or Emscher type, which is roofed over. The plan is circular, the inlet and outlet being at the same elevation and of 12-inch pipe. A manhole should be installed at the right angled bend in the sewer near the intake side. A weir trough and plank baffle are located at the intake and a weir and scum board at the outlet. The capacity of the tank is approximately 10,800 gallons, giving a detention period of about 1¼ hours. The sludge chamber is of sufficient capacity, being about 34 per cent. of the total volume of the tank. The sludge is removed by a centrifugal pump and discharged upon a sludge bed where it is to be plowed under after drying.

A dosing tank is to be included when an increased degree of purification becomes necessary. This will then discharge the sewage upon 8 filter beds, each 22 by 25 feet, in horizontal dimension, and 5½ feet deep. These are to be constructed with concrete walls and bottoms and filled with broken stone. It appears that these additions, when they become necessary, can be made without undue trouble.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design and of local and general requirements with respect to proper methods for the disposal of sewage from the proposed sewer extensions and sewage disposal plant, I beg to recommend that these plans be approved and that a permit allowing the discharge of sewage from the proposed sewer extensions and of sewage effluent from the sewage disposal works for the village when such works shall be constructed be issued to the board of sewer commissioners.

I would further recommend that the permit to be issued contain provisions covering the following points in addition to the usual points covered by the revocation and modification clauses:

1. That within two years the house connections with the present combined sewer in Main street be changed to the sanitary sewer in said street.

2. That manholes be constructed to replace the existing lampholes in Rochester and High streets.

3. That the construction of a settling tank by October 1, 1912, be required.

4. That the settling tank be so constructed as to have a capacity 50 per cent. greater than the tank as shown by plans under consideration.

5. That the operation of the present outfall sewer below the point at which the sewage will be intercepted and conveyed to the disposal plant when constructed be permanently thrown out of use upon the construction of the settling tank.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of Health*

DEAR SIR: — I beg to submit the following report on amended plans for sewage disposal for the village of Avo submitted to this Department for approval on May 7, 191

Plans for sewage disposal and for certain sewer exten of Avon were approved on March 4, 1912. These plans liminary settling tank of the Imhoff or Emscher type to b installation and for sprinkling filters for final or more of the sewage of the village to be constructed whenever be required in the future.

The permit issued in connection with the approval of the provisions that the settling tank shall be constructed on or before October 1, 1912; that the settling tank s with a capacity 50 per cent. greater than that shown b that satisfactory plans for a tank of such greater capacit to this Department for approval before such tank is cons

The plans now before the Department and under consi submitted in accordance with above requirements and from tion of them it is found that the design of the propos to that shown by the approved plans, and that the ca has been increased by about 50 per cent. by increasing its being the same as the original.

The proposed settling tank will have a sufficient capa 1¾ hours detention of sewage when serving the present usual assumptions as to per capita rate of sewage co properly constructed in accordance with the plans and and efficiency should produce an effluent that may be safe the Genesee river without objection at present.

I would, therefore, recommend that the plans be appro opinion, however, that it will not be necessary to issue a pe with the approval of these plans inasmuch as the perm board of sewer commissioners of the village of Avon on Ma the discharge into the Genesee river of effluent from the disposal plant in accordance with the conditions contained

Respectfully submitted,

THEODORE

PERMIT

Application having been duly made to the State Commis as provided by section 77 of chapter 49 of the Laws of 1 Health Law," as amended by chapter 553 of the Laws of 1 chapter 45 of the Consolidated Laws, permission is hereby gi of sewer commissioners of the village of Avon to discha the proposed sewer extensions in Wadsworth avenue and o sewage effluent from the sewage disposal plant for the v plant is constructed into the waters of Genesee river, at bridge, within the municipality of Avon, in accordance with panying the petition, under the following conditions:

1. That this permit shall be revocable at any tim modification or change when in the judgment of the Sta of Health such revocation, modification or change shall be

2. That the issuance of this permit shall not be deem any way action by this Department on any future applic be made for permission to discharge additional sewage the waters of this State.

3. That both the sewer extensions and the sewage dispos by plans approved this day shall be fully constructed in formity with such plans or approved amendments the

herein otherwise provided; and except that the construction of the dosing tank and sprinkling filters, as indicated by the plans together with the piping and apparatus necessary to properly operate the same, may be deferred until required by the State Commissioner of Health.

4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers or sewage disposal works; and that within two years from date the board of sewer commissioners shall require all house sewers to be disconnected from the present 10-inch combined sewer in Main street, and to be connected with the 8-inch sanitary sewer in said street.

5. That no sewage sludge from any part of the disposal works shall be discharged into the Genesee river or any other watercourse.

6. That manholes shall be constructed to replace the existing lampholes in Rochester and High streets.

7. That on or before October 1, 1912, the settling tank shown by plans approved this day shall be constructed and put in operation in compliance with the conditions of the permit issued by this Department on March 31, 1911, and after October 1, 1912, the entire sanitary sewage of the village shall be passed through the said settling tank.

8. That the settling tank shall be constructed with a capacity 50 per cent. greater than that shown by the plans submitted; and that satisfactory plans for a tank of such greater capacity shall be submitted to this Department for approval before such tank is constructed.

9. That upon the construction of said settling tank the present outfall sewer between the manhole at elevation 96 and the manhole at elevation 87 shall be permanently closed at its upper end with a suitable bulkhead.

10. That whenever required by the State Commissioner of Health, satisfactory detailed plans showing the dosing tank and sprinkling filters generally shown by the plans approved this day, or other additional works for more complete treatment of sewage, shall be submitted for approval and upon approval of such plans said dosing tank and sprinkling filters or other additional works shall be constructed and put in operation at such time thereafter as said Commissioner may designate.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

March 4, 1912

BALLSTON SPA

Application for the approval of plans for proposed sewer extensions in the village of Ballston Spa was received from the board of trustees on September 3, 1912. The plans were approved and a permit was granted to the village on September 9, 1912, allowing the discharge into Kayaderosseras creek of sewage from the proposed sewers after such sewage shall first have been passed through the village sewage disposal plant. The permit and report on the examination of the plans follow.

ALBANY, N. Y., *September* 5, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sewer extensions in the village of Ballston Spa, Saratoga county, which were submitted to this Department for approval by the board of trustees on September 3, 1912.

The original sewer system of the village of Ballston Spa was constructed before plans for sewerage and sewage disposal were required to be approved by the State Board of Health. Plans for sewer extensions in the village were approved on February 23, 1899, and plans for additional sewer extensions and for sewage disposal plant consisting of settling tanks and contact beds were approved in the year 1905. Plans for a proposed sewer in High street were approved on July 27, 1908.

The plans now before the Department and under consi it is proposed to construct 6-inch sewers in Hides avenu tributary to the existing 10-inch sewer in Blood stre sewers which are to have a total length of 950 feet, are with slopes of .63 per cent. and .68 per cent., and the sew by them is to be passed through the existing sewage dis its discharge into Kayaderosseras creek.

From our careful examination of the plans it would proposed sewers if properly constructed should be adequat capacities to satisfactorily care for the sanitary sewage of served by them, and I would, therefore, recommend th approved and a permit be issued allowing the discharge i into Kayaderosseras creek after such sewage shall first through the village sewage disposal plant.

Respectfully submitted,

THEODORE H

PERMIT

Application having been duly made to the State Commiss as provided by section 77 of chapter 49 of the Laws of 19 Health Law," as amended by chapter 553 of the Laws of 19 chapter 45 of the Consolidated Laws, permission is hereb board of trustees of the village of Ballston Spa to dischar the proposed sewer extensions in Hides avenue and Grove waters of Kayaderosseras creek, through the outlet of the plant within the town of Milton, in accordance with the plans the petition, under the following conditions:

1. That this permit shall be revocable at any time modification or change when in the judgment of the State of Health such revocation, modification or change shall bec
2. That the issuance of this permit shall not be deeme any way action by this Department on any future applica be made for permission to discharge additional sewage o the waters of this State.
3. That only sanitary or domestic sewage, and no sto surface waters from streets, roofs or other areas shall be the proposed sewers.
4. That all the sewage to be collected by the proposed first be passed through the sewage disposal plant of th Ballston Spa before its discharge into Kayaderosseras cre

EUGENE H. PORTER,
State Commissioner

September 9, 1912

BINGHAMTON

Plans for sewer extensions in the streets listed below have bee during the past year. All permits issued in connection with the these plans contain, in addition to the usual revocation and m clauses, the condition that:

"After September 1, 1914, the sewage from the proposed sewers be discharged without treatment into the Chenango or Susquehan but shall be conveyed to and treated in the sewage disposal works fo of Binghamton in accordance with the provisions of the permit g this Department on February 1, 1910, for the discharge of sewage fourth ward sewer system and in accordance with the notice to the council of the city of Binghamton dated March 7, 1911."

Date of permit	Location of sewer	Stream receiving sewage
Feb. 26	Yager, Ogden, Mersereau and Robinson streets	Chenango river
Feb. 26	Seminary avenue and Lathrop street	Susquehanna river
Mar. 21	Fairview avenue	Chenango river
April 29	Chapin street	Susquehanna river
May 28	Starr avenue and Phelps street	Chenango river
June 13	Hanchett avenue	Chenango river
June 29	Gaylord street and Riverside Drive	Susquehanna and Chenango rivers
July 17	Elm and West streets	Chenango river
Aug. 8	Bevier and Willard streets	Chenango river
Aug. 24	Silver and Grand streets	Chenango river
Oct. 17	Seminary avenue, Chestnut and Worden streets	Susquehanna and Chenango rivers

In addition to the above, plans for a comprehensive sewer system in the Downsville sewer district of the city of Binghamton tributary to the Lestershire system and for modifications of the latter sewer system were submitted for approval jointly by the common council of the city of Binghamton and the board of trustees of the village of Lestershire on January 9, 1912.

These plans were approved on January 17, 1912, and conditional permits allowing the discharge of sewage from the proposed sewers into the Susquehanna river were granted to the city and village authorities. These permits and the report on the examination of the plans follow.

ALBANY, N. Y., *January* 17, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for the proposed Binghamton-Lestershire intercepting sewer to take in the portion of Binghamton known as Downsville which plans were submitted to this Department for approval jointly by the common council of the city of Binghamton and the board of trustees of the village of Lestershire on January 9, 1912.

The plans provide for a comprehensive sanitary sewer system covering an area of some 140 acres in the northwestern section of the city of Binghamton known as Downsville which comprises about three-fourths of the western portion of sewer district "A" shown on the general sewer plan of the city dated October, 1908, recently filed with this Department.

The proposed sewers in this district vary in size from 8 inches to 27 inches in diameter and are to be constructed with slopes sufficiently steep to produce self-cleansing velocities in the sewers under ordinary conditions. Manholes are to be placed at all points of change of slope and alignment and flush tanks are to be installed at the upper ends of all lateral sewers in order to facilitate inspection, flushing and cleaning of the proposed sewer system in Downsville.

The plans have been carefully examined with respect to alignment, sizes, slopes and capacities and other features of a hydraulic and sanitary nature in connection with the proposed sewers and it is found that these sewers should be adequate as to sizes and capacities to satisfactorily care for the sanitary sewage of the district to be served by them provided that in the construction they be made sufficiently water tight to keep out excessive amounts of ground water.

It is proposed to convey the sewage to be collected by these sewers to the so-called Broad street outlet sewer of the village of Lestershire by means of a 27-inch intercepting sewer to be constructed with a slope of 0.07 per cent. The capacity of this latter sewer should be adequate to care for the future contribution of sanitary sewage from the district to be served by it inasmuch as it should be able to carry about 4 cubic feet per second when flowing half full if properly constructed and the rate of sewage contribution from the Downsville sewer district will probably never exceed 2.5 cubic feet per second.

The Broad street outlet sewer, of which the proposed so-called from this district is to be tributary, is one of the vided for by the original plans for sewerage and sewage by this Department on February 27, 1903.

This sewer which is about 6,500 feet long was to vary in to 24 inches in diameter according to the original plans. now under consideration show that it is proposed to incre trunk sewer to 27 inches and 30 inches which will inc capacity of the sewer by from 5.5 to 7 cubic feet per secon

It appears, therefore, that the capacity of the propose let sewer as redesigned will be adequate to care for the a sewage to be contributed by the Downsville sewer district hamton. The size of the main outfall sewer along the rail side Drive and the disposal plant, consisting of some 250 f with a slope of 0.4 per cent., is however not to be change from the disposal plant to the Susquehanna river to be c sections of sewers have, presumably, been constructed ai necessary in future either to increase their capacities o tional sewers parallel to them.

The sewer system of the village of Lestershire is cons bined plan and although the capacity of the Broad street erly constructed should be adequate to care for the ultim sanitary sewage and for the storm water from the district for a reasonable period in the future, no attempt has beer closely how far in the future the capacity will be suffici this territory when fully developed. It is probable that experienced for a number of years in regard to capacity especially in regard to the contribution of sanitary sew small as compared to the storm water provisions necessa type.

The original plans approved in 1903 provided for a s consisting of a septic tank to be located adjacent to tl wanna and Western railroad right of way and just we line of the village of Lestershire.

This tank was designed to give a period of detention hours when serving a population of 4,500 persons, contr rate of 100 gallons per capita per day and will give a to 8 hours when treating the dry weather flow of sewa of from 6,700 to 9,000 persons. It appears, therefore, sufficient capacity to satisfactorily meet the present req disposal for the village of Lestershire and the Downsv the extent of the treatment effected by this type of pl population of Lestershire, according to the census of 19 and the estimated ultimate population of Downsville is a density of population of 20 persons per acre.

The permit granted to the board of trustees of the vill April 10, 1908, extended the time of the construction o plant from February 7, 1908, as required by the permit 7, 1906, and on October 30, 1907, until such time as sh State Commissioner of Health, and the notice issued t of the city of Binghamton on March 7, 1911, stipulated sewer and sewage disposal works shown by the plans ap be completed and put in operation by September 1, 1914

I am of the opinion, therefore, that the village of L cated just below Binghamton on the Susquehanna river treat its dry weather flow of sewage by the time spe Binghamton.

In view of the foregoing I would recommend that t posed sewers in Binghamton and amended plans for th

village of Lestershire be approved and permits be issued allowing temporarily the discharge into the Susquehanna river of sewage to be collected by the proposed sewers and that the permits contain in addition to the usual revocation and modification clauses the provisions that the sewage disposal plant provided for by the original plans approved on February 27, 1903, or approved amendments thereto shall be constructed and put in operation on or before September 1, 1914, and that whenever required by the State Commissioner of Health plans for extensions of such sewage disposal plant or for supplementary or more complete treatment of sewage than that provided for by said plant shall be submitted to this Department for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Binghamton to discharge sewage from the proposed sewers in the "Downsville" district into the waters of the Susquehanna river through the Lestershire sewer system within the town of Union in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

4. That after September 1, 1914, the sewage to be collected by the proposed sewers shall, by joint arrangement between the city of Binghamton and the village of Lestershire, be passed through the sewage disposal works of the village of Lestershire, to be constructed as required by and in accordance with plans approved by this Department.

EUGENE H. PORTER,
State Commissioner of Health

January 17, 1912

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Lestershire to discharge sewage from the proposed sewers in Pratt street, along the Erie railroad and in Riverside Drive into the waters of the Susquehanna river at the point shown by plans approved by this Department on February 27, 1903, within the town of Union in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may

be made for permission to discharge additional sewage waters of this State.

3. That only sanitary or domestic sewage, and no s face water from streets, roofs or other areas shall be to the proposed sewers.

4. That on or before September 1, 1914, the septic t sewage disposal works for the village of Lestershire original plans for sewerage and sewage disposal appr 1903, or as shown by plans amendatory thereto which submitted to and approved by this Department, shall l put in operation and that whenever required by the S of Health plans for extensions to such sewage dispos submitted for approval and such extensions thereafter required by said Commissioner.

5. That whenever required by the State Commissione factory detailed plans for additional works for more co of the sewage of the village shall be submitted for ap approval of said plans any or all portions of such addi mentary works for more complete treatment of sewage sh and put in operation at such time or times thereafter sioner may designate.

6. That the village of Lestershire shall, as provided struct from time to time such additions to the village plant or such additional works for more complete treatm may be deemed necessary by the State Commissioner of I proper treatment of the sewage of the village of Lesters sewage from that portion of the city of Binghamton show approved this day to be tributary to the sewer system o Lestershire.

EUGENE H. PORTER,
State Commission

January 17, 1912

CATTARAUGUS

On October 18, 1912, application was made by the board c the village of Cattaraugus for permission to extend the so-ca outfall sewer. This application was received subsequent to an of the sewerage conditions of the village made by a represen Engineering Division on September 19, 1912 (see page 577 of t and in accordance with the recommendations of this Department. granted to the village authorities follows.

PERMIT

Application having been duly made to the State Commissioner as provided by section 77 of chapter 49 of the Laws of 1909, t Health Law," as amended by chapter 553 of the Laws of 1911, c chapter 45 of the Consolidated Laws, permission is hereby given to of trustees of the village of Cattaraugus to discharge sewage Waverly street outfall sewer into the waters of a branch of C creek near Ellicott street (extended) within the municipality of Ca in accordance with the plans accompanying the petition, under the conditions:

1. That this permit shall be revocable at any time or subject cation or change when in the judgment of the State Commi Health such revocation, modification or change shall become ne

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the water of this State.

3. That on or before December 1, 1914, the village authorities shall have prepared and shall submit to this Department for approval plans showing a complete general system of sanitary sewers and sewage disposal works for the village.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

December 9, 1912

CHEEKTOWAGA

Plans for a sanitary sewer system and sewage disposal plant consisting of settling tanks and contact beds to serve the southwestern portion of the town of Cheektowaga were approved on May 31, 1911. On June 18, 1912, application was made by the town board for the approval of plans for a change of location of the disposal plant. These plans were approved on June 22, 1912, and a permit was granted to the board on the same date which allows the discharge into Buffalo creek of effluent from the proposed plant. The permit and report on the examination of the plans follow.

ALBANY, N. Y., *June* 21, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of the plans showing changes of location of the proposed sewage disposal plant for the sewer district in the southwestern portion of the town of Cheektowaga, Erie county, which plans were submitted for approval by the town board on June 18, 1912.

Plans for sewerage and sewage disposal for this sewer district were approved by this Department on May 31, 1911, and a permit was issued to the town board on the same date which allowed the discharge into Cayuga creek of effluent from the proposed sewage disposal plant consisting of a settling tank, contact beds and auxiliary sludge bed for the disposal of sludge. The plans showed the plant to be located in the town of West Seneca with its nearest point about 150 feet from Clinton street, the plant being located south of Clinton street and about opposite the intersection of Clinton street and Sulphur Springs road. Clinton street forms the southern boundary of the town of Cheektowaga and the northerly boundary of the town of West Seneca in this district. Although this site is in close proximity to the highway it did not appear that there was a more suitable site available and it was not considered that a nuisance would be created for the passerby on the highway owing to the fact that the tank was to be covered, and that the effluent from the tank, as it was intended to be discharged into contact beds, would not fill these beds within six inches of the surface.

Objections were made on May 11, 1912, to the site shown on the original plans and an inspection of the location was made by Mr. H. B. Cleveland, principal assistant engineer of this Department, in company with members of the town board of the town of West Seneca and Attorney Brennan and Engineer Diehl, acting for the town of Cheektowaga.

Accordingly the proposed location of the sewage disposal plant has been changed and it is not believed that the plant in its changed location will be the means of creating a nuisance. The permit granted originally, and if the plans are approved to be reissued at this time, will provide against unsatisfactory operation of the plant.

In view of the above I beg to recommend that the plans showing changed location of the disposal plant be approved and that an amended permit be issued allowing the discharge of effluent from the plant into the waters of Buffalo creek.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State as provided by section 77 of chapter 49 of the L Health Law," as amended by chapter 553 of the I chapter 45 of the Consolidated Laws, permissio town board of the town of Cheektowaga, Erie co from the sewage disposal plant to be constructe proposed sewer system in the southwestern porti waters of Buffalo creek near Clinton street and S the municipality of town of West Seneca in accord panying the petition, under the following conditio

1. That this permit shall be revocable at any cation or change when in the judgment of t Health such revocation, modification or change
2. That the issuance of this permit shall not way action by this Department on any futur made for permission to discharge additional waters of this State.
3. That both the sewer system and the se by plans approved this day shall be fully c formity with such plans or approved amendn
4. That only sanitary or domestic sewage an water from streets, roofs or other areas shall sewers.
5. That no sewage sludge from any part be discharged into Buffalo creek, or any othe
6. That adequate provision shall be made disposal plant for satisfactory devices, appar a proper cycle of operation of the contact bed of effluent from the settling tank to the cont

AL

June 22, 1912 *Acting State*

CORNING

On August 21, 1912, application was made by Corning, for the approval of plans for an intercep for sewage disposal works consisting of settling hypochlorite treatment plant sprinkling filters an sewage of the city. These plans, after a careful returned for revision on September 4, 1912.

Plans, revised in general accordance with the re partment, were resubmitted for approval on Octob 28 formal application for the issuance of a perm city authorities. The revised plans were approved a permit issued allowing the discharge, into the from the settling tanks forming a part of the December 9, 1912, a notice was served on the p city by this Department in accordance with sec Consolidated Laws (The Public Heatlh Law) di all portions of the sanitary intercepting and o ing station and settling tanks shown by the pl and have them completed and put in operation ports on the examination of the plans, the perm low.

ALBA

EUGENE H. PORTER, M.D., *Commissioner of Healt*

DEAR SIR: — I beg to submit the following plans for inverted siphon, outfall sewer and for city of Corning, Steuben county, one set of wh this Department for approval by the mayor of th

The records of this Department show that sewers were constructed in the city of Corning as early as 1888 and that the greater portion of the sewer system on the south side of the Chemung river was constructed on the separate plan. On the north side, which is more sparsely populated than the south side, the sewers have been constructed largely on the combined plan in the past, but steps have been taken during the last few years to separate the storm water and the sanitary sewage in this section.

On November 30, 1908, plans were submitted for minor sewer extensions on the south side of the river, for a comprehensive sanitary sewer system covering the developed portion of the north side not already provided with sewers, for the interception of the dry weather flow of sewage and for a 20-inch outfall sewer to convey the entire dry weather flow and sanitary sewage of the north side of the river to a point of discharge into the Chemung river near the mouth of the Post creek. After a careful examination of these plans by the Engineering Division it was found that they were not in satisfactory condition for approval and the plans were accordingly returned to the city authorities for amendment on February 19, 1909. It was recommended among other things that the then proposed outfall sewer from the intersection of Franklin and Addison streets to the river be increased from 20 inches to 24 inches in diameter inasmuch as it was found that the sewer as designed was too small to adequately meet the demands that might reasonably be made upon it in the future.

On March 2, 1909, plans amended in accordance with the recommendations of this Department and providing for a 24-inch outfall sewer to be laid on a slope of 0.1 per cent. were approved.

The plans recently submitted and now under consideration were prepared by C. C. Vermeule, consulting engineer of New York city, and comprise, in addition to a copy of the engineer's report, single copies of the following plans:

(1) Map of the western half of the city of Corning showing existing sewer system.
(2) Map of the eastern half of the city showing existing sewer system, proposed trunk sewer and sewage disposal works.
(3) General layout of disposal works.
(4) Plan and details of sedimentation tanks.
(5) Plan and sections of pumping station.
(6) Hypochlorite plant and sprinkling filters.

The city of Corning is situated in the central part of the town of Corning, Steuben county, on the Chemung river, immediately below the confluence of the Tioga and Cohocton rivers. It is provided with public sewers serving the greater portion of the city discharging into the Chemung river at two points within the municipality with storm water overflows into Post creek.

The present population of the city, according to the report of the designing engineer, is approximately 14,375 and its area about 1,700 acres, giving an average density of about 8 persons per acre over the entire area of the city. The increase in the population of the city has been moderate, and based on an assumed density of population of 20 persons per acre, it is estimated that the population ultimately to contribute sewage from the sewer system will be approximately 34,000.

The plans have been carefully examined with respect to the proposed inverted siphon and outfall sewer and sewage disposal works. In connection with the siphon and outfall sewer the design has been carefully studied with reference to alignment, sizes, grades, capacities, facilities for cleaning and inspection and flushing and other features of a hydraulic or sanitary nature. In connection with means for sewage disposal it has been studied with reference to general method and efficiency of the sewage disposal plant as a whole, and of the capacities, and the practical operation of the individual structure, appurtenances and apparatus.

The plans show that it is proposed to intercept the existing 24-inch outfall sewer through which the dry weather flow and entire sanitary sewage from

capacity of the two 12-inch lines of the inverted siphon to be constructed at the first installation. Under these conditions there will be an average velocity through the chamber of about 3 feet per minute. This velocity has been found in practice to give satisfactory results.

Although the size of the pipes of the proposed inverted siphon has not been increased the capacity of each of the proposed 12-inch pipes of the siphon has been increased to 1,300,000 gallons per day by decreasing the length of the siphon from 525 feet to 425 feet and, as noted above, provisions are made by the plans for increasing the total carrying capacity of the inverted siphon to about 5,200,000 gallons per day by the future installation of an additional 16-inch pipe. The two 12-inch pipes will have sufficient capacity to care for the probable maximum rate of contribution of sanitary sewage from the north side of the river for a considerable period in the future, and the ultimate installation will provide for a carrying capacity somewhat in excess of the capacity of the 24-inch sewer above and below the siphon.

The size of the trunk sewer has been increased from 18 inches to 24 inches in diameter, as recommended, and the screen chamber is to be divided into two compartments. Each compartment is to be 3 feet wide and will be provided with two sets of removable bar screens. It would appear, however, that these chambers are somewhat narrow, and it may be found necessary to enlarge them in the near future in order to lessen the cost of maintenance.

It is also proposed to enlarge the pumping station sufficiently to accommodate a 30-horse-power gasoline engine and generator to be used in case of emergency. Under ordinary conditions the electricity used for motive power is to be supplied by the local company.

The design of the preliminary settling tanks is the same as shown by the original plans, except that the elevations of these tanks have been raised 3 feet in order to provide for a greater operating head for the sprinkling filter required by the addition of a dosing tank.

The dosing tank is to be provided with a 24-inch discharge siphon by means of which the effluent from the settling tanks would be discharged into the distributing system of the sprinkling filter in doses at intervals of about 8 minutes when handling a flow of 2,170,000 gallons per day. Provisions are also made at the dosing tank for by-passing the sprinkling filters in case of emergency or during extreme high-water stages, at which times the settling tank effluent will be discharged directly into the river.

According to the plans the proposed dosing tank is to be rectangular in plan with vertical sides. I am of the opinion that a more uniform distribution of the effluent over the surface of the filter, and more satisfactory results would be obtained from a taper tank, and I would therefore recommend that in the construction the tank be tapered.

The depth of the filtering material has been increased to 5.5 feet and the filter itself has been enlarged so that, when all these units are constructed, it should, with proper operation, care for a population of about 28,000 persons. Two final settling tanks have been added which would provide for a detention of about two hours with a flow of 2,170,000 gallons per day. The sludge from these tanks is to be cared for on separate beds to be located adjacent to the tanks.

Application is made by the board of public works for the temporary omission from construction of the supplementary treatment works, including the hypochlorite treatment plant, dosing tank, sprinkling filter and final settling tanks and sludge beds connected therewith. I am of the opinion that the preliminary treatment works, if properly constructed in accordance with the plans and if operated with care and efficiency, should produce an effluent which may be safely discharged into the Chemung river without objection at present. The design of the entire plant is comprehensive and so planned that either the hypochlorite treatment plant or the sprinkling filters may be constructed whenever required in the future without reconstructing the preliminary treatment works.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge into the Chemung river of effluent

1907, when the sanitary survey of the Susquehanna river was made by this Department. The stream below Corning is used for water supply purposes after filtration, by the city of Elmira, which is situated some 18 miles below Corning, and in Pennsylvania many municipalities derive their water supply from the Susquehanna river, a number of which do not employ filtration.

The proposed site for the disposal plant appears to be favorably located both with reference to the city of Corning and to the south side outfall sewer. According to the report of the designing engineer the elevation of the mean low water mark at the disposal plant site is 903 and the extreme high water mark at elevation 914. The elevation of the flow line of the settling tanks is 919, the flow line of the hypochlorite detention tank is to be at 914 and the elevation of the top of the sprinkling filter at 913.5. It appears, therefore, that the operation of the sprinkling filter only will be interfered with for short periods during extreme high water stages of the river. The disposal works are to be further protected from floods by means of a dike or embankment which is to be constructed around the plant. The top of the proposed dyke is to be at elevation 918.

The junction of the proposed sewer from the north side of the river and the south side outfall sewer is to be made at a screen chamber near the proposed pumping station at the disposal plant. This chamber is to be 30 inches wide and 6 feet 6 inches long and is to be provided with one and one-half-inch mesh screens. It appears that the proposed screen chamber is inadequate as to size and of improper arrangement to carry out economically the work for which it is designed and better results would in all probability be obtained if the screen chamber were considerably wider and provided with two compartments in order to facilitate cleaning and insure continuous operation. It would also appear that the cost of maintenance could be reduced considerably by installing inclined bar screens with proper facilities for raking the screens and for handling the screenings in place of the proposed mesh screens.

From the screen chamber the screened sewage is to flow into the receiving well of the proposed pumping station. Two submerged centrifugal pumps which are to be driven by 25 horse-power electric motors are to be installed in the pump well, by means of which the sewage is to be discharged into the inlet trough of the two settling tanks of the disposal plant against an average head of about 15 feet.

These tanks which are of the Imhoff type provide for a horizontal flow of sewage and are so arranged as to permit of a reversal of the flow and thereby give a more uniform distribution of the sludge in the sludge compartments than would otherwise be obtained. Each tank is divided by means of partition walls into an upper or settling compartment for the clarification of sewage, and two lower or sludge compartments for the collection and digestion of sludge.

The settling compartments of the two tanks have sufficient capacity to provide for about 5½ hours' detention of sewage when treating the present measured flow of sanitary sewage of the entire city, or 4 hours when all the houses on the north side are connected. The sludge compartments have a combined capacity equal to about 35 per cent. of the total effective capacity of the tanks and should be adequate to provide proper facilities for storage and decomposition of sludge.

The sludge from the sludge compartments is to be removed by gravity flow to adjacent sludge beds by means of 8-inch sludge pipes and distributing troughs. These beds, which are to be filled to a depth of 1½ feet with graded gravel and sand, are to be underdrained and the effluent returned to the pump well to be again treated in the settling tanks.

From the settling tanks the clarified effluent may either be passed through the proposed hypochlorite plant or discharged into the distributing system of the sprinkling filters for additional treatment. The designing engineer's report recommends the immedate installation of the hypochlorite plant for supplementary treatment and suggests that the construction of the sprinkling filters be deferred until such times as a more complete treatment of the sewage shall be required. No formal application has, however, been received

from the city officials asking for permission to temporar
of the supplementary treatment works.

The hypochlorite plant is to consist of a mixing tank
a small control or constant level dosing tank, a mixi
with baffles and a detention tank. The latter tank w
period of detention of about 20 minutes when caring
weather flow of sewage and should be sufficiently large

It is proposed to use 50 ponds of hypochlorite per
sewage, which is equal to about two parts of available ch
With our present knowledge of the action of hypochlorite
appear that not less than 5 to 10 parts of available chl
should be used in treating clarified sewage, so that it w
be advisable to use less than 125 ponds of hypochlorite pe
in the case of Corning, especially in view of the fact that
of the city of Elmira is taken from the Chemung river af
18 miles below the proposed disposal plant.

The plans also show details of a sprinkling filter divi
having a total superficial area of about .9 acres. This fil
to a depth of 4½ feet with broken stone ranging in size f
2½ inches in diameter. The sewage is to be applied to t
filter by means of Taylor nozzles spaced 10 feet apart on
filter, on the usual assumptions as to per capita rate of sew
would operate at an average rate of about 1,800,000 gallons
when serving the present estimated population of the city
therefore, that the proposed sprinkling filter, if properly co
care for a somewhat larger population than the present.

The effluent pipe from the settling tanks is to be connecte
distributing system of the sprinkling filter and although this
vided with valves and so arranged that either or all of the
the filter may be operated at a time, no provisions are ma
the head on the nozzles by means of dosing tank and siphons
which is essential to the uniform distribution of the sewage o
of the filter and the proper operation of the disposal works of

The depth of the filtering material of 4½ feet provided fo
is insufficient to produce satisfactory results with the size
used and should be increased to not less than 5 feet and prefe
in depth. It is also essential that the effluent from the spr
should be passed through short detention settling tanks in o
an effluent fairly free from suspended matters at all times an
should be provided for in this case.

In conclusion I would say that it appears from our exami
plans that although the design of the proposed works has receive
study and consideration and that the plans are generally acce
are certain important revisions in the plans desirable before t
final approval and the plans should be modified in a number o
follows:

1. Details of the control chamber at the upper end of t
inverted siphon should be submitted.

2. Sand catcher should be provided at the upper end of
siphon.

3. The size of the pipes of the inverted siphon should be i

4. The size of the trunk sewer between the siphon and t
plant should be increased to not less than 24 inches in dia
a slope of 0.1 per cent.

5. The screen chamber at the disposal plant should be en
rearranged.

6. The amount of hypochlorite which it is proposed to use
increased to from 125 pounds to 250 pounds per 1,000,000 ga
exact amount to be used to be determined upon during the op
the plant.

7. A dosing tank or other means for providing for a vari
and more uniform distribution of the sewage over the surface of
should be provided.

8. The depth of the filtering material in the sprinkling filter should be increased to not less than 5 feet and preferably 6 feet.
9. The plans should provide for a final settling tank to be constructed in connection with the sprinkling filter when it is installed.

I would therefore recommend that the plans be returned for additions, amendments or modifications in accordance with the above suggestions and that the designing engineer be requested to resubmit the plans in duplicate after revision in order that one set of the plans, if approved, may be returned to the city authorities and the other set retained in this office for filing.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 29, 1912.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on our examination of revised plans for outfall sewers and for sewage disposal works for the city of Corning, which were resubmitted for approval on October 3, 1912. Formal application for the approval of plans on a blank furnished by the Department was received from the board of public works on October 28, 1912.

The plans were first submitted for approval by the city authorities on August 21, 1912, and after a careful examination of them by the Engineering Division a report was submitted to you under date of August 29, 1912, setting forth the results of this examination and making recommendations for certain changes and revisions before the final acceptance of them. The plans were accordingly returned by you to the designing engineer on September 4, 1912, for modifications and additions in the following respects:

(1) Details of the control chamber at the upper end of the proposed inverted siphon should be submitted.

(2) Sand catcher should be provided at the upper end of the inverted siphon.

(3) The size of the pipes of the inverted siphon should be increased.

(4) The size of the trunk sewer between the siphon and the disposal plant should be increased to not less than 24 inches in diameter with a slope of 0.1 per cent.

(5) The screen chamber at the disposal plant should be enlarged and rearranged.

(6) The amount of hypochlorite which it is proposed to use should be increased to from 125 pounds to 250 pounds per million gallons, the exact amount to be used to be determined upon during the operation of the plant.

(7) A dosing tank or other means for providing for a variable head and more uniform distribution of the sewage over the surface of the filter should be provided.

(8) The depth of the filtering material in the sprinkling filter should be increased to not less than 5 feet and preferably 6 feet.

(9) The plans should provide for a final settling tank to be constructed in connection with the sprinkling filter when it is installed.

After a careful examination of the revised plans it is found that they have in general been modified in accordance with all of the above requirements.

The control chamber at the head of the inverted siphon is shown in detail and provides for the future installation of a 16-inch line across the river in addition to the proposed 12-inch lines of pipe which comprise the siphon.

Between the present outfall sewer on the north side of the Chemung river and the proposed control chamber is to be placed the sand catcher, which is also shown in detail on the plans.

This structure is to be divided into two compartments, each of which is to be 10 feet wide, 12 feet long, with a maximum depth of about 6 feet. These chambers when clean will give a detention of about 4 minutes when treating an average flow of 2,600,000 gallons, which is equal to the carrying

These plans were first submitted for approval on October 14, 1911, but were returned to the designing engineer on November 2, inasmuch as the plans had not been submitted in accordance with the requirements of article 11, chapter 62, of the Consolidated Laws (the Town Law), which provides for the establishment of sewer districts outside of unincorporated villages. It was shown, however, that it was impossible to establish a sewer district in the section in question and the plans were accordingly resubmitted for approval on March 8, 1912.

These plans were carefully examined and a report was submitted to you under date of March 22, 1912, setting forth the results of this examination and making recommendations for certain modifications before the final acceptance of them. The plans were accordingly returned to Mr. Weaver on March 25, 1912, with the recommendation that they be amended in the following respects:

(1) That the bar screens of the screen chamber be redesigned so as to provide for a spacing of the bars of not less than 1 inch apart in the clear.

(2) That the screen be extended higher above the flow line in the tank so as to provide for a greater screening area.

(3) That the proposed septic tank be divided into two compartments so arranged that one or both compartments may be operated at a time in order to facilitate the removal of sludge.

The amended plans now before the Department show that they have been revised in accordance with all of the above requirements, and I would therefore recommend that the plans be approved and a permit be issued allowing the discharge into the Barge canal of effluent from the proposed sewage disposal plant on condition that whenever required by the State Commissioner of Health plans for more complete treatment of the sewage shall be submitted for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Mr. S. J. Weaver to discharge effluent from the sewage disposal plant to be constructed in connection with the proposed sewers on the property of Mr. Weaver, in the town of Deerfield, into the waters of the Barge canal, near North Genesee street, within the town of Deerfield, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into the Barge canal, Reel's creek, or any other watercourse.

from the proposed sewage disposal plant, and that permission for the temporary omission from construction of the supplementary treatment works be granted, on condition that such additional or supplementary works be constructed whenever required by the State Commissioner of Health.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of public works of the city of Corning to discharge effluent from the settling tanks forming a part of the sewage disposal works for the city of Corning into the waters of Chemung river near said disposal works within the municipality of Corning, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewers and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That, except on the north side of the Chemung river, only sanitary or domestic sewage and no storm water or surface water shall be admitted to the sanitary sewer system of the city, and after November 1, 1917, no storm or surface water shall be admitted to any sewer in the city of Corning conveying sanitary or domestic sewage.
5. That no sewage sludge from any part of the disposal works shall be discharged into the Chemung river or any other watercourse.
6. That whenever required by the State Commissioner of Health the additional or supplementary works for more complete treatment of sewage, shown by the plans approved this day, shall be constructed and put in operation within a time limit then specified.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

October 30, 1912

To the Board of Public Works of the City of Corning:

GENTLEMEN: — Pursuant to the provisions of the Public Health Law and in accordance with condition 4 of the permit for the discharge of sewage from the sanitary sewer system north of the Chemung river and from lateral sanitary sewers on the south side of said river in the city of Corning into the waters of the Chemung river at Corning, granted on March 12, 1909, the city of Corning is hereby notified to construct all portions of the sanitary intercepting and outfall sewers and the pumping station and settling tanks forming a portion of the sewage disposal works shown by plans approved on October 30, 1912, and have them completed and put in operation by October 1, 1914.

This notice is hereby given in accordance with and under the provisions of section 77 of chapter 45 of the Consolidated Laws (the Public Health Law) on this 9th day of December, 1912.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

population of the town of Eastchester, including the two villages, has more than doubled in 10 years and, based on an assumed density of 15 persons per acre, it is estimated that the population ultimately to contribute sewage from the sewer district will be approximately 27,000.

The plans provide for five main outlets for the sewers in the entire district and two minor outlets, as follows:

The Brook avenue outlet, which is directly into the Bronx Valley trunk sewer, will serve an area of about 325 acres in the east and west sections.

Another outlet, also serving portions of both east and west sections with a combined area of 430 acres, passes westerly to the Bronx Valley trunk sewer, about 1,800 feet northerly from the Tuckahoe village boundary line.

The Fisher Avenue-Bronx Parkway outlet, which is to be constructed by the sewer commissioners of the town sewer district, passes through the village of Tuckahoe and discharges directly into the Bronx Valley trunk sewer. The combined area of the district in the east and west sections served by this outlet is about 250 acres. A small section, including and adjacent to Lincoln avenue, is tributary to this outlet.

The Cronins Hill-Marbledale Road outlet covers a combined area in the two sections of about 170 acres. The sewage from this district is to be discharged with the existing sewer in Marbledale road, in the village of Tuckahoe, forming a part of the Tuckahoe village sewer system.

The Paulding Manor district lies in the southeasterly portion of the town and, as noted above, it has not been decided as yet what disposition will be made of the sewage from this subdistrict, which comprises an area of over 500 acres. It is apparent that, before sewers in this district are constructed, further details should be submitted and the plans should be completed. The detailed plans of the ejector stations and the pumping station should be submitted, and cast-iron pipe crossing should be provided and shown by the plans wherever sewers in this district cross or are adjacent to Hutchinson creek and the reservoirs on this stream, from which the public water supply of the city of Mount Vernon is derived.

The plans for the proposed sewer system have been carefully examined and the design carefully studied with reference to alignment, sizes, slopes, capacities, facilities for cleaning and inspection and flushing and other features of an hydraulic or sanitary nature, and it is found that the proposed sewers, if properly constructed, should be adequate to serve the purpose for which they are intended, except that the design, as noted above, is incomplete with reference to sewerage in the east section of the district.

With reference to the final disposition of sewage from this district it should be noted that sewage tributary to the Tuckahoe sewer system will be passed through the Tuckahoe sewage disposal plant and that, if arrangements are made to discharge sewage from the Paulding Manor district into the Mount Vernon sewer system, such sewage will pass through the Mount Vernon sewage disposal plant. The remaining sewage to be collected by the proposed sewers will be discharged into the Bronx Valley trunk sewer.

A copy of an agreement between the sewer commissioners of the Eastchester sewer district and the trustees of the village of Tuckahoe, providing for the construction of sewers through the village of Tuckahoe by the sewer commissioners of the Eastchester sewer district, and providing for the discharge of sewage from certain sections of the sewer district into the sewer system of the village of Tuckahoe, accompanies the plans. The report further states that, if it is decided to construct an outlet sewer through the village of Bronxville and pump sewage from the Paulding Manor district into such outlet sewer, agreement to this effect will be entered into with the trustees of the village of Bronxville and preliminary negotiations have already been entered into to this end.

In view of the above I beg to recommend that the plans for the proposed sewers be approved on condition that, before the construction of the sewers in the east section of the Eastchester sewer district, more definite and complete plans, including details as referred to above, shall be submitted for approval.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

his normal assessment, but that he had been unable to make any progress in the matter. In view of these facts it was felt that the application would be reconsidered provided the plans were resubmitted in satisfactory form.

The plans were accordingly resubmitted for approval on March 8, 1912, and show that it is proposed to construct some 652 feet of 8-inch sewer in Weaver street, from Deerfield road to and in a proposed street leading to the disposal plant to be located adjacent to the Barge canal. The proposed sewer is to be constructed with a slope of .53 per cent., which should be sufficiently steep to produce self-cleansing velocities under ordinary conditions. The sewer if properly constructed should be adequate as to size and capacity to satisfactorily care for the sanitary sewage of the district to be served by it.

The sewage disposal plant is to consist of a single compartment septic tank to be constructed at the first installation, and the plans also provide for an area 50 x 150 feet to be reserved for contact beds should such supplementary treatment ever become necessary in the future.

The sewage upon reaching the proposed septic tank is to be passed through a small screen chamber 24 inches wide to be located in one corner of the tank, and provided with a bar screen to be composed of 3-inch by ⅜-inch bars spaced ½ inch apart in the clear. It appears that, owing to the short length of the sewer and the consequent fresh condition of the sewage when reaching the disposal plant, the bars should be spaced at not less than 1 inch apart in the clear in order to prevent rapid clogging of the screen and reduce the cost of maintenance. The screen, moreover, should extend higher above the flow line in the tank so as to give greater screening area than will be obtained under the proposed arrangement of the screen. It should not be necessary, however, to have the screen extend as far below the flow line of the tank, as shown by the plans, so that the desired change can be effected simply by raising the screen and without increasing the length of the individual bars and by placing the ledge on which the screen is to rest at a higher elevation.

The proposed septic tank is to be rectangular in plan, 20½ x 12 feet, with an effective depth of 3 feet, and is provided with longitudinal partition wall extending from the inlet end of the tank to within 2 feet of the other end. The tank has sufficient capacity to give about 7 hours' detention of sewage when serving an estimated future population of 500 persons, and will give about 70 hours' detention of sewage when serving the present population of 50 persons on the usual assumptions as to per capita rate of sewage contribution.

It would appear therefore that the tank is adequate as to size and capacity if properly constructed to care for the ultimate future population to be served by it without enlarging the tank. It should, however, be divided into two compartments so arranged that one compartment may be operated at a time if necessary in order to facilitate cleaning and the removal of sludge.

In conclusion, I would state that the plans are not in satisfactory shape for approval, and I would therefore recommend that the plans be returned for amendments, additions or modifications in accordance with the recommendations embodied in this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *April* 16, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewerage and sewage disposal for the property of Mr. S. J. Weaver in the town of Deerfield, Oneida county, which were submitted for approval on April 9, 1912.

These plans were first submitted for approval o were returned to the designing engineer on Noven plans had not been submitted in accordance with th 11, chapter 62, of the Consolidated Laws (the Town] the establishment of sewer districts outside of uni was shown, however, that it was impossible to estal the section in question and the plans were accor approval on March 8, 1912.

These plans were carefully examined and a report under date of March 22, 1912, setting forth the resul and making recommendations for certain modifications ance of them. The plans were accordingly returned to 25, 1912, with the recommendation that they be ame respects:

(1) That the bar screens of the screen chamber to provide for a spacing of the bars of not less than clear.

(2) That the screen be extended higher above the t so as to provide for a greater screening area.

(3) That the proposed septic tank be divided into so arranged that one or both compartments may be in order to facilitate the removal of sludge.

The amended plans now before the Department show th revised in accordance with all of the above requirements, a fore recommend that the plans be approved and a permit l the discharge into the Barge canal of effluent from the disposal plant on condition that whenever required by the St of Health plans for more complete treatment of the sewage sl for approval.

Respectfully submitted,

THEODORE HO

C

PERMIT

Application having been duly made to the State Commissio as provided by section 76 of chapter 49 of the Laws of 1909, Health Law," as amended by chapter 553 of the Laws of 1911, chapter 45 of the Consolidated Laws, permission is hereby given Weaver to discharge effluent from the sewage disposal plant to b in connection with the proposed sewers on the property of Mr. the town of Deerfield, into the waters of the Barge canal, near N street, within the town of Deerfield, in accordance with the plans ing the petition, under the following conditions:

1. That this permit shall be revocable at any time or subje fication or change when in the judgment of the State Comm Health such revocation, modification or change shall become ne

2. That the issuance of this permit shall not be deemed t any way action by this Department on any future application be made for permission to discharge additional sewage or eff the waters of this State.

3. That both the sewer system and the sewage disposal wor by plans approved this day shall be fully constructed in comp formity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water face water from streets, roofs or other areas shall be admitted proposed sewers.

5. That no sewage sludge from any part of the disposal work be discharged into the Barge canal, Reel's creek, or any other course.

6. That whenever required by the State Commissioner of Health, satisfactory detailed plans for additional works for more complete treatment of the sewage to be collected by the proposed sewers shall be submitted for approval, and upon approval of said plans any or all portions of such additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

EUGENE H. PORTER,
State Commissioner of Health

April 17, 1912

EASTCHESTER (T)

On October 23, 1912, plans for a separate system of sewers in the town of Eastchester were submitted for approval. These plans were approved on November 27, 1912, on condition that before the construction of the sewers in the eastern portion of the Eastchester sewer district, more definite and complete plans, including details of ejector and pumping stations and creek crossings, be submitted for approval. The report on the examination of the plans follows.

ALBANY, N. Y., *November* 27, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a separate system of sewers for the sewer district in the town of Eastchester, covering all portions of the town outside the incorporated villages of Bronxville and Tuckahoe, submitted by the sewer commissioners of the district on October 23, 1912.

The plans submitted were prepared by Rogers & Latimer, civil engineers of New York city, and comprise two blue prints of the map of the sewer system, which is shown in two sections, east and west of White Plains road, and duplicate sets of blue prints of profiles of sewers in the west district. The report of the engineer states that it is proposed to construct only those portions of the system in the west district, part of which sewers are to be tributary to the sewer system of the village of Tuckahoe and part directly tributary to the Bronx Valley trunk sewer.

The report states that it is desired that action be taken on the plans at an early date in order that the sewers in White Plains road and the Waverly district may be constructed within a short time, since the State Highway Department are soon to construct a State highway in White Plains road.

Although the plans submitted show proposed sewers in the east section of the town sewer district, these plans are not complete in that details of the proposed ejector stations and of the pumping station are not shown, and in fact, as stated by the report of the engineer, it has not yet been decided whether to discharge sewage from a portion of this section into the sewer system of the city of Mount Vernon, provided arrangements can be made with the city for so discharging this sewage, or whether sewage from this district will be pumped into an outlet sewer passing through the village of Bronxville and discharging into the Bronx Valley trunk sewer. For this reason it is not possible as yet for the sewer commissioners to submit complete plans for the system in the east district.

The town of Eastchester is situated in the southerly portion of Westchester county and lies between the Bronx river and Hutchinson creek. It is bounded on the north by the town of Scarsdale and on the south by the city of Mount Vernon. A public water supply is provided to residents in this district by the New York Interurban Water Co.

The present population of the town of Eastchester, exclusive of the two incorporated villages in the town, Bronxville and Tuckahoe, according to the 1910 United States Census, is approximately 1,850, and this constitutes the present population to be served by the proposed sewer system. The area of the district, exclusive of reservoirs, cemeteries, etc., is about 1,800 acres, giving a density of population at present of about one person per acre. The

population of the town of Eastchester, including the t
than doubled in 10 years and, based on an assumed
per acre, it is estimated that the population ultimately
from the sewer district will be approximately 27,000.

The plans provide for five main outlets for the sewers
and two minor outlets, as follows:

The Brook avenue outlet, which is directly into the
sewer, will serve an area of about 325 acres in the east

Another outlet, also serving portions of both east an
a combined area of 430 acres, passes westerly to the
sewer, about 1,800 feet northerly from the Tuckahoe vill

The Fisher Avenue-Bronx Parkway outlet, which is t
the sewer commissioners of the town sewer district, passes
of Tuckahoe and discharges directly into the Bronx V
The combined area of the district in the east and west
this outlet is about 250 acres. A small section, includin
Lincoln avenue, is tributary to this outlet.

The Cronins Hill-Marbledale Road outlet covers a combin
sections of about 170 acres. The sewage from this dist
charged with the existing sewer in Marbledale road, in the
hoe, forming a part of the Tuckahoe village sewer system.

The Paulding Manor district lies in the southeasterly po
and, as noted above, it has not been decided as yet what di
made of the sewage from this subdistrict, which comprises
500 acres. It is apparent that, before sewers in this district
further details should be submitted and the plans should be
detailed plans of the ejector stations and the pumping st
submitted, and cast-iron pipe crossing should be provided an
plans wherever sewers in this district cross or are adjacent
creek and the reservoirs on this stream, from which the publi
of the city of Mount Vernon is derived.

The plans for the proposed sewer system have been caref
and the design carefully studied with reference to alignment,
capacities, facilities for cleaning and inspection and flushi
features of an hydraulic or sanitary nature, and it is found
posed sewers, if properly constructed, should be adequate to s
pose for which they are intended, except that the design, as no
incomplete with reference to sewerage in the east section of the

With reference to the final disposition of sewage from thi
should be noted that sewage tributary to the Tuckahoe sewer
be passed through the Tuckahoe sewage disposal plant and that,
ments are made to discharge sewage from the Paulding Manor
the Mount Vernon sewer system, such sewage will pass through
Vernon sewage disposal plant. The remaining sewage to be colle
proposed sewers will be discharged into the Bronx Valley trunk sev

A copy of an agreement between the sewer commissioners of the E
sewer district and the trustees of the village of Tuckahoe, providi
construction of sewers through the village of Tuckahoe by the s
missioners of the Eastchester sewer district, and providing for the
of sewage from certain sections of the sewer district into the sew
of the village of Tuckahoe, accompanies the plans. The report furt
that, if it is decided to construct an outlet sewer through the v
Bronxville and pump sewage from the Paulding Manor district i
outlet sewer, agreement to this effect will be entered into with the
of the village of Bronxville and preliminary negotiations have alrea
entered into to this end.

In view of the above I beg to recommend that the plans for the p
sewers be approved on condition that, before the construction of the
in the east section of the Eastchester sewer district, more definite an
plete plans, including details as referred to above, shall be submitt
approval.

Respectfully submitted,

THEODORE HORTON,

Chief Engin

FIRE ISLAND (State Park)

Plans for water supply and sewage disposal for the Fire Island State Park on Long Island were submitted for approval by the State Architect on March 11, 1912. The plans were not in satisfactory condition for final acceptance, and were therefore returned to the State Architect for modifications and additional data on March 25.

Plans revised in general accordance with the recommendations of this Department were resubmitted on April 15, 1912, and were approved on April 23, 1912. The reports on the examination of the plans follow.

ALBANY, N. Y., *March* 22, 1912.

EUGENE H. PORTER, M.D., *Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for water supply and sewage disposal for the proposed comfort station and bathing pavilion at the Fire Island State Park, in the town of Islip, Suffolk county, submitted to this Department for approval by the State Architect on March 11, 1912.

According to the report of the State Architect, Fire Island Park, which is situated almost directly south of the village of Islip, L. I., is used largely for bathing and picnic purposes by people from the southern shore of Long Island, and the proposed improvements, consisting of a new public comfort station, water supply for the various buildings and sewage disposal for the comfort station and bathing pavilion, together with plumbing fixtures and piping for these latter structures, are to be installed by the Fire Island Park Commission. No statement, however, is submitted as to the number of people to be cared for, the estimated water consumption and the yield of the proposed well, and no details of either the permanent or the temporary pumping outfits are shown, so that it is impossible to determine even approximately the adequacy of the proposed water supply and sewage disposal systems.

It appears from the plans that the water supply for drinking purposes and for flushing the closets and urinals is to be derived from a sheeted dug well to be located near the center of the island some 700 feet from the proposed cesspools, and that the water is ultimately to be pumped to an elevated water tank which is to feed the distributing system, consisting of 3-inch cast-iron pipe and 1½-inch galvanized wrought-iron pipe.

The plans further show that it is proposed to dispose of the sewage from the eight closets and one urinal at the comfort station by means of a shallow leaching cesspool and subsurface irrigation system. The cesspool, which is to be 8 feet in diameter, is to be excavated to a depth of about 6 inches below the invert of the inlet and is to have a checkerwork bottom formed by three layers of brick.

It appears that satisfactory results would probably not be obtained from a cesspool constructed in this manner, inasmuch as the spaces between the brick of which the bottom is formed would probably become rapidly clogged with sludge, after which the sewage would flow directly into the subsurface irrigation system with little or no clarification of such sewage. This would tend to clog the irrigation system and insanitary conditions would probably result.

A clarified effluent, and one more suitable for treatment by means of a subsurface irrigation system, could be obtained by first passing the sewage through an ordinary water-tight settling tank provided with baffles and submerged inlet and outlet. It might also be found necessary to discharge the effluent into the irrigation system in regular doses by means of a dosing tank and discharge siphon, and to so arrange the field that different portions of it could be used on alternate days or alternate weeks, thereby providing periods of rest.

According to the specifications it is proposed to care for the sewage from the two water closets in the bathing pavilion by means of two leaching cesspools, 4 feet in diameter and similar in construction to the large cesspool shown by the plans, except that there are to be no outlets and the sewage is

to receive no supplementary treatment. In the abs as to sewage contribution it would seem that this be satisfactory, inasmuch as each cesspool will be one closet and will therefore probably not be ov cesspools should, however, be shown on the plans, estimated number of persons to be cared for by submitted.

From a careful examination of the plans it app satisfactory condition for final approval, and that hand to permit of a final examination of them.

I would therefore recommend that the plans be ret ments or additions in accordance with the recommen body of this report, and that the State Architect b tional data as to the estimated yield of the proposed able daily consumption and the estimated populatic water supply and by the different sewage disposal pla

Respectfully submitted,

THEODO

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of Healt*

DEAR SIR: — I beg to submit the following report on plans for water supply and sewage disposal at the Fire in the town of Islip, Suffolk county, which plans we approval by the State Architect on April 15, 1912.

These plans were first submitted for your approval on after a careful examination of them by the Engineering Di submitted to you under date of March 22, 1912, setting fo this examination and making recommendations for certair additions before the final acceptance of them.

The plans were accordingly returned to the State Archi 1912, for additional data and for amendments or modificati of the disposal plants.

From our careful examination of the amended plans it is have been revised in general accordance with the recomme Department, and the additional information called for in ref lation, water supply and water consumption has been furnish mental report of the State Architect.

It appears from this report that the estimated number of park on any one day during last summer did not exceed 7 maximum of 200 persons per day is to be provided for in f ments. The water consumption is estimated at 10 gallons p day, which is probably a fair assumption, inasmuch as the w used for no other domestic purposes than drinking and for th closets, and the yield of the proposed well, based on the yield o well, is taken at 20 gallons per minute, which should be ampl requirements on the basis of the assumed population and per ca water consumption.

According to the report of the State Architect it appears that a pumping outfit, not shown on the plans, is to be installed by the mission for use during the coming season and that, for a permane tion, it is proposed to install a centrifugal pump to be driven by engine, by means of which the water is to be forced into an elev of about 3,500 gallon capacity located some 30 feet above the gener level and which is to supply the distributing system as noted in my report. Detail plans for the proposed permanent water supply syste however, be submitted to this Department for approval before the tion of the same shall be commenced.

The revised plans show that it is proposed to construct a combination leaching cesspool and settling tank for the preliminary treatment of the sewage from the comfort station in place of the leaching cesspool shown on the plans first submitted. The proposed structure which is to be constructed of brick and concrete is to be 8 feet in diameter and about 6 feet deep with a depth of flow of about 2 feet. It is to be provided with submerged inlet and outlets and with a manhole which makes it accessible for cleaning and inspection.

While the lower portion of the structure is to be practically water tight in order to prevent partially treated sewage from flowing directly into the ground water, the portion near the flow line is to be constructed of brick with the headers omitted in order to permit portions of the liquid to leach away in the sand where it will have better opportunity of becoming purified before reaching the ground water.

The settled effluent which does not escape through the openings in the sides of the tank is to overflow through submerged outlets into a system of subsurface irrigation tiles 4 and 5 inches in diameter which radiate from the tank and cover an area of about .2 acres. Provisions are also made for future extensions to this system. On the basis of design used the settling tank has sufficient capacity to give an average period of detention of from 2 to 6.5 hours even though none of the sewage should escape through the sides of the tank and the subsurface irrigation system on the same assumptions will be required to operate at the rate of from 3,700 to 10,000 gallons per acre per day when serving a population of from 75 to 200 persons.

It is proposed to treat the sewage from the two waterclosets at the bathhouse in two leaching cesspools, 4 feet in diameter and about 4.5 feet deep, similar in construction to the tank at the main disposal plant except that these small cesspools are not to be provided with artificial bottoms and will be operated as leaching cesspools. Manholes are also to be provided for these structures in order to permit of cleaning and inspecting them.

With reference therefore to the plans for sewage disposal I would state that they have been examined only with reference to provision for sewage disposal and it is found that the proposed sewage disposal plants if properly constructed in accordance with the plans and operated with care and efficiency would in all probability satisfactorily care for the sewage at the park. I would therefore recommend that they be approved.

In regard to plans for water supply however there are two essential points involved; one with reference to the submission of detailed plans in connection with the permanent works as previously outlined and the approval of the proposed temporary works during the coming season, and the other in reference to the sanitary quality of the water to be obtained.

In connection with the detailed plans for permanent system it is recommended that such plans be submitted before final approval of them is given. With reference to the temporary works it is assumed that the water will be secured from the well shown upon the plans and it is recommended that this plan be provisionally approved pending the submission and approval of detailed plans for the permanent works.

With reference to the question of quality of the proposed supply it would appear that whereas the distances between the proposed well and the disposal plants may be sufficient to prevent a pollution of the water supply, there can be no guarantee that this pollution might not occur. It depends largely upon the relative elevations of the ground water at the disposal plant and at the well during periods of lowering of water at the well while pumping and there is a possibility that any sewage reaching the well under such conditions might not be completely purified.

The proposition is therefore indeterminate in this respect and the facts can only be positively known after the system has been in operation and analyses have been made of the water.

The only effective and safe way of doing this would be to sink a test well on a direct line between the proposed water supply well and the larger sewage disposal plant, the position of which test well should be from one-quarter to one-third the distance from the well to the disposal plant. The well should be at such a depth as to enable samples of water to be secured

from the upper level of the ground water. The s
and analyzed by the Park Commission at frequent
mer and starting immediately following the put
in operation and if any evidence of pollution is
and before this pollution could reach the main
abandoned and a new one selected at a greater a
sewage disposal plant.

With these limitations and conditions therefore
the present sources of water supply be tentatively
stood that if there is any indication of a pollutio
means of tests above suggested this source be aban
greater distance be secured.

Very respectfully sub
THEOD

FRANKFORT

Plans for a preliminary sewage disposal plant, c
station, screen chamber and auxiliary sludge drying
general plans for sprinkling filters for the more comp
sewage of the village of Frankfort, were submitted f
10, 1912. These plans were approved on May 2, 1912
issued in connection with the approval of them, inas
granted to the village authorities on April 19, 1911,
into the Mohawk river of effluent from a sewage dispo
structed in accordance with the plans approved by this
6, 1904, or in conformity with "amendments to the
approved." The report on the examination of the plans

ALBANY, N. Y.,

EUGENE H. PORTER, M.D., *State Commissioner of Health,*

DEAR SIR: — I beg to submit the following report on
amended plans for sewage disposal for the village of Fra
county, submitted to this Department for approval April 1

The records of the Department show that on July 6,
approved for a system of separate sewers and for sewage dis
sisting of a settling tank and contact beds. Plans showing
the plans for the proposed sewer system were approved Apr
on the same date permission was granted to the board of
village to temporarily omit the construction of certain sewe
Elizabeth and other streets, and of the contact beds of the
plant shown by plans approved in 1904. On July 26, 1911, pla
location of the sewage disposal plant were approved.

The plans now submitted were prepared by Vrooman & Pe
engineers of Canajoharie, and comprise five sheets of plans in d
ing general layout and details of the proposed sewage disposal

The village of Frankfort, which has a population of 3,300 pers
to the census of 1910, is situated in the northeastern part of
Frankfort on the south side of the Mohawk river. It is prov
unfiltered water supply derived from springs, and the present wa
tion is estimated at about 220,000 gallons per day. The wat
controlled by the municipality. The village, according to the r
designing engineers, is constructing a comprehensive sanitary se
covering practically the entire village, under plans approve
Department.

It is proposed to treat the sewage collected by this system in
disposal plant located near the Mohawk river in the town of
just outside of the corporation line, and about 360 feet southeast o
street which crosses the Mohawk river near the disposal plant. Th
has a drainage area above this point of approximately 610 squa

with a large urban and rural population on the watershed. The city of Utica is located about 9 miles above Frankfort and has a population of some 75,000 persons. Immediately below Frankfort and within 5 miles of it are situated the villages of Ilion, Mohawk and Herkimer.

The average flow of the river during the summer varies from about 180 to 360 cubic feet per second, and it is evident that with the large and rapidly increasing population on the watershed of this river no additional sewage should be discharged into it without proper treatment and that steps should be taken to remove what pollution now enters the river as far and as rapidly as possible.

The river at the disposal plant is to be canalized and will form part of the Barge canal, which is now under construction by the State of New York. According to the report of the designing engineers, the normal pool level of the proposed canal will be at elevation 383, the ordinary high water at 390, and the maximum high water at 394. The flow line of the proposed disposal plant is to be at elevation 386, so that the normal operation of the plant will not be interfered with except at high water stages, and the disposal plant is so arranged that the water will not set back into the settling tank if properly operated, inasmuch as the clarified sewage is to flow by gravity into the pump well from which it is to be discharged into the river by means of an automatically operated centrifugal pump or sewage ejector at times of high water.

The plans provide for a sewage disposal plant consisting of screen chamber, settling tank, pumping station and sludge bed to be constructed at the first installation, and these structures are shown in detail. General plans are also shown for a complete sewage disposal works to be constructed whenever supplementary or more complete treatment of the sewage shall be required than that provided for by the detailed plans. These works are to consist of screen chamber, two settling tanks of the Imhoff type, four sprinkling filters 7 feet deep, two sludge beds, pumping plant with pumping equipment in duplicate, together with piping and other appurtenances so arranged that either of the tanks can be used as preliminary or final settling tanks if desired. The pumps are also to be arranged so that settled sewage, sprinkling filter effluent or sludge may be pumped. The sprinkling filters, which are to have a total area of about .3 acres, will care for twice the present population when operating at the rate of 2,000,000 gallons per acre per day.

Screen Chamber

The sewage upon reaching the disposal plant is to be passed through the screen chamber 6 feet square and about 8 feet deep, which is to be covered by a small building. This chamber is to be provided with a bar screen 6 feet long and about 6 feet wide, with bars spaced 1¾ inches. A by-pass is also provided at the screen chamber by means of which the sewage may be discharged directly into the river in case of emergency.

Settling Tank

The settling tank is to be a covered central radial flow tank of the Emscher or Imhoff type, 30 feet in diameter and about 38 feet deep, with a depth of liquid of about 28 feet. It is to be divided into an upper or settling compartment and a lower or sludge compartment for the storage and decomposition of sludge. The upper or settling compartment has sufficient capacity to give about three hours of detention of sewage when serving the present population of 3,300 persons in the village based on the usual assumptions as to per capita rate of sewage contribution.

A concentric reinforced concrete partition separates the settling compartment from the sludge compartment and is so arranged that the solid particles which settle from the sewage pass downward through slots to the sludge chamber, and in connection with a concrete baffle along the inside periphery of the upper portion of the sludge chamber permit the gases generated in the sludge to pass up through the central vertical shaft without disturbing the sewage passing through the settling compartment above.

gallon pumps. The pumps which are to be placed in a dry well are to be protected by means of bar screens consisting of 1-inch by ¼-inch flat bars spaced one inch apart on centers.

Although the pump well will have a capacity of less than 7,000 gallons the plans provide for backing up of the sewage into the main outfall sewers sufficiently to permit of pumping about 35,000 gallons each time that the pumps are started.

The sewage is to be pumped to the disposal plant through an 18-inch force main some 5,400 feet long against a static head of about 19 feet. The losses of head due to friction will of course vary with the amount of sewage which is cared for so that under maximum operating conditions the pumps will probably be required to operate against a total head of some 30 feet.

It is proposed to treat the sewage collected by the village sewer system in a sewage disposal plant located near the intersection of Cow and Smith creeks which are tributary to Freeport creek, a small tidal stream emptying into Merrick bay and East bay. Although these streams have a total drainage area at the disposal plant site of about 6 square miles, the upper reaches of the creek are used for water supply purposes for the borough of Brooklyn which reduces the flow considerably. The disposal site which consists of a plot of about 18 acres is situated southeast of the village limits.

The proposed sewage disposal plant consists of a settling tank, intermittent sand filters and auxiliary sludge beds for the disposal of sludge. The settling tank which is of the Imhoff type is divided into 3 units which are to be operated in parallel and has sufficient settling capacity to give a detention of about 3¼ hours when serving the present population on the usual assumptions as to per capita rate of sewage contribution. The sludge compartment located below the settling compartment and separated from it by means of reinforced concrete partition walls has sufficient capacity to permit of the storage and digestion of sludge. The sludge is to be removed from these compartments by gravity flow through 8-inch sludge pipes and will be disposed of on adjacent sludge drying beds.

The clarified effluent from the settling tank is to be conveyed to intermittent sand filters through a 24-inch reinforced concrete pipe. These filter beds, which are to be divided into 5 units, have a total area of about 4.6 acres, according to the scaled dimensions, and will be required to operate at a rate of 141,000 gallons per acre per day when serving the present population on the usual assumptions as to per capita rate of water consumption.

The filter beds are to be filled to a depth of 3½ feet with sand, dredged from the bed of Freeport creek, and are to be provided with adequate distributing and collecting systems. The distributing system is to consist of creosoted wooden troughs. A main trough is to extend longitudinally along the center line of each bed and lateral trough, with ¾-inch circular openings spaced 10 feet apart, are to extend from the main trough at right angles to it. The collecting system for each bed is to consist of 4 parallel lines of 6-inch vitrified pipe laid with open joints which are to discharge into an 18-inch main collecting drain through which the effluent reaches Cow creek.

It is important to note in this connection that the distributing system is to be hand operated. According to the report of the designing engineers the installation of an automatic device for the distribution of the effluent from the settling tank to the sand filters would cost about $8,000 and in their opinion the benefits resulting therefrom would not be commensurate with the increase in the cost of construction.

This depends, however, upon the care and efficiency with which hand controlled devices are operated. Although more satisfactory results are usually obtained from automatic distributing devices for intermittent filters than from hand distribution under the conditions ordinarily attendant upon the operation of municipal sewage disposal plants, it is possible to get equally good results from the latter, provided the beds are dosed intermittently. Unless sand filters are alternately dosed and drained, the sewage is simply strained with little or no nitrification and the beds clog rapidly so that under no circumstances should the sewage be allowed to flow continuously to one bed for more than a day at a time. In fact the sewage should not be per-

FRANKLINVILLE

On July 3, 1912, application was made by the board of trustees of the village of Franklinville for the approval of plans for proposed sewer extensions in Washburn and other streets in the village. These plans were approved on July 13, 1912, and a permit was issued, allowing the discharge into Ischua creek of sewage from the proposed sewers after such sewage shall first have been passed through the village sewage disposal works.

At the request of the board of trustees a permit was granted to the village to operate the sewer system and to discharge sewage directly into the irrigation field temporarily deferring the operation of the Imhoff tank, forming part of the sewage disposal work of the village, until May 1, 1913, on condition that not more than fifteen connections shall be made with the public sewer system during this period.

ALBANY, N. Y., *July* 6, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on examination of plans for proposed sanitary sewer extensions in the village of Franklinville, Cattaraugus county, which were submitted to this Department for approval by the board of trustees on July 3, 1912.

Plans for a comprehensive sewer system covering practically the entire area of the village, and for sewage disposal works consisting of settling tank, broad irrigation fields and auxiliary sludge beds for the disposal of sludge, were approved by this Department on June 13, 1911. The plans now before this Department and under consideration show that it is proposed to extend this sewer system by constructing 8-inch sewers in Washburn and Church streets and Pennsylvania avenue and connecting sewers tributary to the sewer system and sewage disposal plant, for which plans have already been approved as noted above.

From our careful examination of the plans it appears that the proposed sewers are to be constructed with slopes sufficiently steep to produce self-cleansing velocities under ordinary conditions, and if properly constructed, should satisfactorily care for the sanitary sewage of the districts to be served by them.

I would therefore recommend that the plans be approved and a permit be issued allowing the discharge into Ischua creek of sewage to be collected by the proposed sewers after such sewage shall first have been passed through the sewage disposal plant, plans for which have been approved by this Department.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of village of Franklinville to discharge sewage from the proposed sewers in Washburn and other streets into the waters of Ischua creek through outfall of village sewage disposal works within the municipality of Franklinville, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage, face water from streets, roofs or other are proposed sewers.

4. That all the sewage to be collected by passed through the sewage disposal works c charge into Ischua creek.

EUGENE I
State

July 13, 1912

FREEPORT

Plans for sewerage and sewage disposal for the submitted for approval by the board of trustees on were returned for modification on December 7 aft nation of them. Revised plans were submitted on were approved on December 21, 1912. The permit i the approval of these plans allows the discharge, in from the proposed sewage disposal works which are tank of the Imhoff type, intermittent sand filters an ing beds for the disposal of sludge. The permit and t nation of the plans are given below.

ALBANY, N. Y.

EUGENE H. PORTER, M.D., *State Commissioner of Heal*

DEAR SIR: — I beg to submit the following report plans for sewerage and sewage disposal for the villag county, which were resubmitted to this Department for of trustees on December 12, 1912.

These plans were previously submitted on November liminary examination of them and a conference with a of the designing engineers the plans were returned for a of the crossings under the Brooklyn water-works co through the village.

The plans were prepared by Smith & Malcolmson, civil port, and Alexander Potter, consulting engineer of New prise tracings and blue prints of the following sheets:

1. Map of Freeport showing sanitary sewer syste pumping station and disposal plant.
2. Four sheets of profiles of outfall sewers.
3. Details of sewer appurtenances.
4. Details of manhole cover.
5. Plan, section and elevation of pumping station.
6. Details of siphons and flush tanks.
7. Location, plan and details of intermittent filters.
8. Plan, section and details of settling tanks.
9. Detailed sections of settling tank.
10. Location, plan and details of sludge bed.

The village of Freeport is located on the southern shore on Freeport, Emory and Millbourne creeks which flow through discharge into Hempstead bay. It is provided with an unfilt ply taken from wells and the works are controlled by the mu though the village is not provided with public sewers consider discharged into the creeks which flow through the village th drains and overflowing cesspools, creating insanitary conditions be largely if not entirely abated by the installation of a pu system.

The present population of the village, according to the report ing engineers, is about 6,500 and its area is 1,990 acres, givin density of about 3 persons per acre over the entire area. The in population has been very rapid during the past few years, havin

average of about 12½ per cent. per year during the past 6 years. Based on an assumed density of population of 20 persons per acre it is estimated that the population that will ultimately contribute sewage to the proposed system will be approximately 40,000.

The plans have been carefully examined with respect to the sewerage system and sewage disposal works. In connection with the sewer system the design has been studied with reference to alignment, sizes, grades, capacities and other features of an hydraulic or sanitary nature. In connection with means for sewage disposal it has been studied with reference to the general method and efficiency of the sewage disposal plant as a whole and of the capacities and operation of the individual structures.

According to the plans the village is divided into three distinct drainage areas designated as the eastern, central and western sewer districts. The proposed sewers which are to care for sanitary sewage only vary in size from 8 to 24 inches in diameter and although many of them are to be laid on minimum slopes, owing to the flat nature of the territory, flush tanks are to be installed at the upper ends of lateral sewers which should tend to prevent clogging of the sewers under ordinary conditions.

All sewers are to be laid with straight alignments and manholes are to be installed at all points of change of slope and alignment and at intermediate points to be not more than 350 feet apart.

The Brooklyn aqueduct which consists of a large masonry conduit forming a part of the water supply system of Brooklyn is to be crossed by the outfall sewers of the proposed system at three points. At one of these crossings, namely, South Bay View avenue, the sewer will be carried over the conduit on a uniform slope.

At Harrison avenue the sewer is to be carried under the conduit by means of a double tube inverted siphon consisting of one 6-inch cast-iron pipe and one 8-inch cast-iron pipe. A difference of elevation of one foot is provided between the upper and lower ends of the siphon which should provide sufficient head to give a carrying capacity equal to that of the 15-inch sewer above the siphon. The capacity of the siphon may, however, be increased by nearly 50 per cent. by permitting the sewage to back up to the height of about 12 inches in the sewer above which will give it a capacity equal to the 18-inch sewer below the crossing.

At Brookside avenue the sewer is to be carried over the conduit by means of an overhead siphon consisting of two 6-inch cast-iron pipes. A steel tank 15 inches by 3 feet to be used to exhaust the tank is to be connected with the lower leg of each pipe on the siphon. It is intended that these tanks are to be used both for the purpose of starting the siphon and for exhausting any gases that may accumulate in the siphon.

It appears from the report of the engineers that the construction of a true siphon at this point will result in considerable saving inasmuch as the cost of carrying the sewer under the conduit would be quite large owing to the elevation of the ground water at this point and the depth at which it would be necessary to lay the pipes. Although the successful continuous operation of this siphon is somewhat doubtful and no instances are known of a siphon of this type being operated under similar conditions, I would recommend that this device be tried out on condition that an inverted siphon be substituted in case it is found not to operate satisfactorily.

The new 6-foot steel water pipe of the Brooklyn water supply system also passes through the village south of and nearly parallel to the masonry conduit. This pipe, however, is laid at an elevation sufficiently high to permit of carrying the trunk sewers which cross it at three points, under the pipe, on a uniform slope.

The sewage from the entire village is to be conveyed by gravity flow to the proposed pumping plant to be located near the intersection of Cedar and South Grove streets. This plant is to be provided with three centrifugal pumps having a total capacity of 5,500,000 gallons. Two of these pumps are to be operated by electric motors and the third pump by means of a 20 horse-power gasoline engine which is to be used in case of emergency. Provisions are also made at the plant for the future installation of two additional 3,000,000

disposal plants in the undeveloped districts are marked on the plans. Details of these sewers and sewage disposal plants should, however, be submitted for approval before any of the sewers shown in blue on the plans are constructed.

The proposed sewers in the district to be constructed at the first installation are to have straight alignments and manholes are to be installed at all points of change of slope or alignment. Flush tanks are also to be constructed at the upper ends of lateral sewers and at a few other points in order to facilitate flushing of the sewers. The slopes of the proposed sewers, however, have not been worked out in detail in all cases, and are for the most part only approximate so that it will probably be necessary to work out the design more in detail before the sewers are constructed. It appears, however, that the fall available is adequate in all cases and sufficient to produce self-cleansing velocities in the sewers under ordinary conditions, and that if the sewers are properly constructed they should be adequate as to sizes and capacities to satisfactorily care for the sanitary sewage of the district to be served by them.

It is proposed to treat the sewage collected by this system in two sewage disposal plants. One of these disposal plants which is to serve a small area known as Landing Road district is to consist of an Imhoff tank and sterilization plant and is to be located at the foot of Landing road. Sterilized effluent from this plant is to be discharged directly into Hempstead harbor through the outfall sewer some 750 feet long.

The other disposal plant which is to serve the greater portion of the sewer district is to consist of a settling tank, sand filters and sludge bed to be located on the south side of Glen Cove creek about ½ mile from its mouth and not far from the developed portions of the district. This stream, which has a drainage area above this point of approximately six square miles, is a tidal stream at the disposal plant and no public water supply is derived from it below this point.

The sewage upon reaching the main disposal plant is to be passed through a one compartment screen chamber before reaching the settling tank. This tank which is to be an open, central, radial flow tank of the Imhoff or Emscher type is to be about 27½ feet in diameter and about 31 feet deep. It is to be divided, by means of a concrete partition, into an upper or settling compartment, and a lower or sludge compartment for the storage and decomposition of sludge. The upper or settling compartment has sufficient capacity to give about two hours' detention of sewage when serving a population of 4,000 persons, based on the usual assumptions as to per capita rate of sewage contribution.

The sludge compartment, located below the settling compartment, has a storage capacity for sludge somewhat in excess of the capacity of the settling compartment, and should be adequate to provide sufficient storage for the sludge to allow it to become thoroughly rotted out before it is disposed of. A water pressure pipe, terminating in a perforated ring near the bottom of the sludge compartment, is to be provided for the purpose of breaking up the sludge if necessary and the sludge is to be removed by gravity to a sludge bed through an 8-inch sludge pipe which extends to within a short distance of the bottom of the tank. The sludge bed, which is to be 25 feet by 50 feet, is to be filled to a depth of one foot with filtering material, and the effluent from the bed is to be discharged into Glen Cove creek.

The effluent from the Imhoff tank is to be treated on two sand filters having a total area of one acre and the sewage is to be supplied to them continuously. These filters, which are to be three feet deep, will be required to operate at the rate of 400,000 gallons per acre per day when serving 4,000 people on the basis of design used. Provisions are made by the plans for the future extension of the disposal plant by the construction of additional filters, settling tank and sludge bed.

The Imhoff tank to be constructed in connection with the Landing Road sewer district is of similar design to the larger settling tank and has a capacity equal to about one-tenth of the large tank. The effluent from this small tank is to be treated with a disinfectant before it is to be discharged into the harbor and the sludge from it is to be discharged into a sludge well from which, according to the report of the designing engineers, it is to be pumped into scavengers' wagons and taken away for disposal.

mitted to flow continuously to each bed or set of beds more than a fraction of a day. It is also essential that each bed should be allowed to rest for a few days at a time at regular intervals.

It is very important, in the case of hand operated devices, that the man in charge of the plant should be given specific instructions as to the proper operation of the works in order to obtain satisfactory results.

The digested sludge withdrawn from the sludge compartments of the settling tank is to be discharged upon the sludge drying beds by means of a rectangular concrete trough. There are to be three beds having a total area of 6,000 square feet and each bed is to be underdrained with a 6-inch vitrified pipe laid with open joints. The main collecting drain which discharges into Cow creek is 8 inches in diameter. The filtering material is to consist of graded broken stone ranging in size from 3 inches at the bottom to 1/16 of an inch at the top.

I am of the opinion that a thin layer of coarse sand should be placed on top of the broken stone in order to facilitate removing the dried sludge and prevent clogging of the interstices of the filtering material.

From our careful examination of the plans it is found that the proposed sewer system and sewage disposal plant, if properly constructed in accordance with the plans and operated with care and efficiency, should satisfactorily care for the sanitary sewage of the village and I would therefore recommend that the plans be approved and a permit issued under the following conditions in addition to the usual revocation and modification clauses:

(1) That if any difficulty is met with in the operation of the overhead siphon described above, an inverted siphon shall be installed in place of the true siphon shown by the plans.

(2) That a thin layer of sand shall be placed on the sludge drying beds.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Freeport to discharge effluent from the sewage disposal works to be constructed in connection with the proposed sewer system for the village into the waters of Cow creek near its junction with Freeport creek within the municipality of the town of Hempstead in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into Cow creek, Hempstead bay or any other watercourse or body of water.

6. That if any difficulty is met with in the operation of the overhead siphon in Brookside avenue, an inverted siphon shall be installed in place of the true siphon shown by the plans.

7. That a thin layer of sand shall be placed on the sludge drying beds.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

December 21, 1912

FULTON COUNTY TUBERCULO

Plans for a proposed sewage disposal plant to t
Fulton County Tuberculosis Hospital were approve
disposal plant is to consist of a settling tank
system. The report on the examination of the pla

ALBANY

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to report as follows on the pla
the Fulton County Tuberculosis Hospital to be loc
in the town of Mayfield, Fulton county.

The report of the engineer accompanying the pla
be about 25 persons being treated at or connected
a possible maximum of 35 persons. It is estimated
amount of sewage will be less than 2,500 gallons ord
flow of 3,500 gallons and a maximum of 5,000 gallons

It is proposed to use as a tank the structure used
mental sprinkling filter constructed by the city of Glov
about 12 feet 10 inches in diameter, with 8 feet dept
capacity of approximately 7,500 gallons. This tank i
baffles and sludge baffles and with openings through the
pipe. The flow from the tank passes through a mesh
space, this screen having 15 square feet surface area
through this screen into the dosing chamber which has 6
From the dosing chamber the effluent is discharged throug
sewage siphon into a subsurface irrigation system which
portion of the plant. In this system there are to be 1,40
fied tile pipe laid with open joints on a .5 per cent. grade a
beneath the ground surface, in parallel lines spaced 10 fe
a total area of about 12.000 square feet.

The soil is a coarse uniform sand and the area is loca
of the buildings. It is proposed, should it be found tha
the tank does not seep into the sand at all points, to pass
the surface of a sand filter. Therefore, under the plans
described in the report of the engineer there is to be no d
effluent into a stream.

From our careful examination of the plans it is found
properly constructed and operated should serve the purp
provide a satisfactory means of disposing of the sewage from
hospital. I would, therefore, recommend that the plans b
forwarded to the board of supervisors of Fulton county,
required in this case.

Respectfully submitted,

THEODORE F

C

These plans were approved on June 17, 1912, and forwarde
of supervisors of Fulton county in accordance with the above rec

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GLEN COVE

On March 29, 1912, application was made by the sewer co
of the Glen Cove sewer district for the approval of plans for s
sewage disposal in that portion of the town of Oyster Bay kno
Cove. After a preliminary examination of the plans which showe
were not in satisfactory condition for approval, they were re
modifications and additions on April 3, 1912. Plans, revised
accordance with the recommendations of this Department, were re
for approval on April 29 and were approved on May 8, 1912. A c

permit which allows the discharge into Hempstead harbor and Glen Cove creek of effluent from the two sewage disposal plants to be constructed in connection with the sewer system was granted to the sewer commissioners. The permit and report on the examination of the plans are given below.

ALBANY, N. Y., *May* 6, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewerage and sewage disposal for the Glen Cove sewer district in the town of Oyster Bay, Nassau county, resubmitted to this Department for approval by the sewer commissioners on April 29, 1912.

These plans were previously submitted on March 29, and after a preliminary examination of them by the Engineering Division it was found that they were not in satisfactory condition for approval in a number of respects the more important of which were set forth in the memorandum dated April 2. The plans were accordingly returned for amendments, revisions or additions to the designing engineer who called at the Department by appointment on April 3 for the purpose of reviewing the plans and thereby hastening the revision of them. After considerable correspondence and other conferences between the members of the Engineering Division and the designing engineers both in this office and in New York city, the plans have finally been resubmitted in general accordance with the recommendations of this Department.

The Glen Cove sewer district, which comprises one of the existing school districts of the town of Oyster Bay, is situated in the northwestern part of the town on Hempstead harbor and Long Island sound. It is provided with an unfiltered water supply taken from wells and the works are controlled by the Nassau County Water Company. Although the district is not provided with public sewers the sanitary sewage from a large part of Glen Cove is at present cared for in cesspools and private sewers many of which overflow or discharge directly into Glen Cove creek which flows through the southwestern portion of the sewer district and empties into Hempstead harbor at Mosquito Cove near the northerly boundary of the village of Sea Cliff. The discharge of sewage into this stream has created insanitary conditions along its course especially at the ponds in the district formed by dams constructed across the stream for power developing purposes and it has been the subject of a number of complaints to this Department.

The present population of the sewer district, according to the report of the designing engineer, is approximately 6,000. Although the plans provide for sewerage for the entire district it is proposed to construct at present only the sewers in the more thickly settled portions of the district near Glen Cove creek and the disposal plants shown by the plans in detail are designed to care for a population of some 4,000 persons.

The plans have been carefully examined with respect to the sewer system and sewage disposal works. In connection with the sewer system the design has been carefully studied with reference to alignments, grades, capacities, sizes, facilities for cleaning, flushing and inspection and other features of an hydraulic and sanitary nature. In connection with the means for sewage disposal it has been studied with reference to general methods and efficiency of the sewage disposal plants as a whole and of the capacities and practical operation of the individual structures and appurtenances.

The plans show in detail the sewer system in the south central portion of the district and show in a general way the alignments of the sewers in blue in the outlying districts designated on the plans as A, B and C. These latter districts, according to the report of the designing engineer, are either wholly unoccupied or are occupied by large estates, some of which are 1,000 acres in extent and which are provided with private sewage disposal systems. It is estimated by the designing engineers that these tracts of land will not be subdivided in the life of the system and that, therefore, it was not necessary to show sewers in detail or to provide sewerage facilities in this section at this time. Alignments of the sewers are shown, however, in all existing streets and roads in these sections and the approximate location of future

disposal plants in the undeveloped districts are ma
of these sewers and sewage disposal plants should.
approval before any of the sewers shown in blue on

The proposed sewers in the district to be construc
are to have straight alignments and manholes are
of change of slope or alignment. Flush tanks are
the upper ends of lateral sewers and at a few
facilitate flushing of the sewers. The slopes of the
have not been worked out in detail in all cases, a
only approximate so that it will probably be ne
design more in detail before the sewers are construct
that the fall available is adequate in all cases and
cleansing velocities in the sewers under ordinary
the sewers are properly constructed they should be
capacities to satisfactorily care for the sanitary se
be served by them.

It is proposed to treat the sewage collected by thi
disposal plants. One of these disposal plants whic
area known as Landing Road district is to consist
sterilization plant and is to be located at the foot of La
effluent from this plant is to be discharged directly i
through the outfall sewer some 750 feet long.

The other disposal plant which is to serve the greate
district is to consist of a settling tank, sand filters
located on the south side of Glen Cove creek about ½
and not far from the developed portions of the district.
has a drainage area above this point of approximately
a tidal stream at the disposal plant and no public wat
from it below this point.

The sewage upon reaching the main disposal plant is to
one compartment screen chamber before reaching the s
tank which is to be an open, central, radial flow tank of the
type is to be about 27½ feet in diameter and about 31
be divided, by means of a concrete partition, into an upp
partment, and a lower or sludge compartment for the stor
tion of sludge. The upper or settling compartment has su
give about two hours' detention of sewage when serving
4,000 persons, based on the usual assumptions as to per cap
contribution.

The sludge compartment, located below the settling con
storage capacity for sludge somewhat in excess of the capaci
compartment, and should be adequate to provide sufficient
sludge to allow it to become thoroughly rotted out before i
A water pressure pipe, terminating in a perforated ring ne
the sludge compartment, is to be provided for the purpose of
sludge if necessary and the sludge is to be removed by gra
bed through an 8-inch sludge pipe which extends to within
of the bottom of the tank. The sludge bed, which is to be 25
is to be filled to a depth of one foot with filtering material,
from the bed is to be discharged into Glen Cove creek.

The effluent from the Imhoff tank is to be treated on two san
a total area of one acre and the sewage is to be supplied to them
These filters, which are to be three feet deep, will be required
the rate of 400,000 gallons per acre per day when serving 4,
the basis of design used. Provisions are made by the plans f
extension of the disposal plant by the construction of additional fi
tank and sludge bed.

The Imhoff tank to be constructed in connection with the L
sewer district is of similar design to the larger settling tank
capacity equal to about one-tenth of the large tank. The effluen
small tank is to be treated with a disinfectant before it is to be
into the harbor and the sludge from it is to be discharged into a
from which, according to the report of the designing engineers,
pumped into scavengers' wagons and taken away for disposal.

From a careful examination of the plans it appears that both sewage disposal plants if properly constructed and operated with care and efficiency should furnish an effluent which may be safely discharged into Glen Cove creek and Hempstead harbor at present without objection. The sewage disposal plants, however, should be enlarged as indicated by the plans whenever the population tributary to them shall exceed that for which they were designed and detailed plans for the sewers and sewage disposal plants in the outlying sections of the proposed sewer district should be submitted to this Department for approval before any such sewers or sewage disposal plants are constructed.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into Hempstead harbor and Glen Cove creek of effluent from the proposed sewage disposal plants shown in detail by the plans, and that the permit contain in addition to the usual revocation and modification clauses the conditions that the sewage disposal plants shown by the detailed plans shall be enlarged whenever required by the State Commissioner of Health and that detailed plans for the proposed sewers and sewage disposal plants for the outlying sections of the sewer district shall be submitted to this Department for approval before any such sewers or sewage disposal plants are constructed.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the sewer commissioners of the Glen Cove sewer district to discharge effluent from the sewage disposal works to be constructed in connection with the proposed sewer system in said district into the waters of Hempstead harbor and Glen Cove creek as shown by the plans within the town of Oyster Bay, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge from any part of the disposal works shall be discharged into Hempstead harbor, Glen Cove creek or any other watercourse.
6. That whenever required by the State Commissioner of Health the sewage disposal works shown by the detailed plans approved this day shall be extended within the time limit then specified in accordance with satisfactory plans approved by this Department.
7. That no sewers or sewage disposal works shall be constructed in those portions of the sewer district in which sewers and sewage disposal works are not shown in detail by the present plans until satisfactory, detailed plans for such sewers and sewage disposal works shall be submitted to and approved by this Department.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

May 8, 1912

HAMILTON COLLEC

On August 8, 1912, application was made by th the Hamilton College sewer district for the appro and sewage disposal. The plans were approved o permit was issued the same date which allows the creek of effluent from the proposed sewage dispos settling tank of the Imhoff type and sludge drying the report on the examination of the plans are print

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of Hea*

DEAR SIR: — I beg to submit the following report plans for sewerage and sewage disposal for the Hami trict in Oneida county, which plans were submitted t approval by the sewer commissioners on August 2, 1912.

The plans were prepared by Mr. A. M. Scripture, Hartford, N. Y., and comprise, in addition to duplicate specifications, blue prints of the following plans in dupli

1. General plan of sewer district showing sewer disposal works.
2. Details of sewage disposal works.
3. Details of appurtenances.
4. Profiles of sewers.

The sewer district is situated in the northwestern part o land about one mile west of the village of Clinton on is provided with a water supply taken from springs and trolled by the college. The sewer district, according to th signing engineer, is provided with cesspools for the most sewer serving a number of the college buildings discharges small stream tributary to Oriskany creek.

The present population of the sewer district, according report, is about 200 during the summer months and from 4 the remainder of the college year. The area of the district i giving an average density of population of about 2 persons

The plans have been carefully examined with respect to t tem and sewage disposal works. In connection with the sewe design has been carefully studied with reference to alignmen capacities and facilities for cleaning and inspection and flus features of an hydraulic and sanitary nature. In connection for sewage disposal it has been studied with reference to the and efficiency of the sewage disposal plant as a whole and of and practical operation of the plant.

The proposed sewers which are to vary in size from 6 to 8 i eter are to be constructed with slopes sufficiently steep to produ ing velocities under ordinary conditions. Manholes are to be of change of alignment and flush tanks are to be located at th of lateral sewers.

It is proposed to convey the entire sanitary sewage of the the point in Bristol street to the disposal plant site on the east kany creek, a distance of some 1,300 feet, by means of the inv consisting of a single tube of 4-inch cast-iron pipe. A valve blow-off so arranged that all portions of the siphon may be flus blown off into Oriskany creek is to be installed on the west side o before the siphon passes under the stream. No provisions are ever, for screening the sewage before it enters the siphon.

I am of the opinion that owing to the small size of the pipe u siphon it is essential to remove by screening or otherwise the con rial in the sewage that would tend to clog the siphon. This would be most readily done by installing a small screen chamber at the of the siphon or near Bristol street. It appears, moreover, that t

has not adequate capacity to provide for any material increase in the population and it may be necessary to later install an additional pipe to convey the sewage from the sewer system to the sewage disposal plant.

It is proposed to treat the sewage of the proposed sewer system in a sewage disposal plant to be located on the west side of Oriskany creek about 1,000 feet north of College street. This stream has a drainage area above this point of approximately 100 square miles consisting mostly of rugged territory with a fairly large urban and rural population. The stream is not used for water supply purposes below the proposed sewage disposal plans and receives sewage from a large number of manufacturing establishments located above and below the plant.

The proposed sewage disposal plant is to consist of a settling tank of the Imhoff type, and sludge drying bed for the disposal of sludge. The proposed tank is to be circular in plan with a diameter of 14 feet and is to have a depth of 17 feet from the flow line to the bottom of the sludge compartment. It is divided by means of partitions into an upper or settling compartment for the clarification of the sewage, and a lower or sludge compartment for the storage and decomposition of sludge.

The settling compartment has sufficient capacity to give about 3½ hours' detention of sewage when serving a population of 500 people on the usual assumptions as to per capita rate of sewage contribution. The sludge compartment which is located below the settling compartment and separated from it has a capacity of about ⅔ that of the settling compartment and should be adequate to provide ample storage for the sludge where it may be digested before its discharge to the sludge bed.

The sludge is to be removed from the tank by means of an 8-inch sludge pipe and discharged by gravity to the proposed sludge bed. This bed is underdrained and filled to a depth of 17 inches with graded broken stone and will have a top layer of sand one inch thick. The underdrains from the sludge bed are to discharge into the effluent pipe from the settling tank which in turn discharges into Oriskany creek near the disposal plant.

The plans also show the location of sand filter beds which it is proposed to construct whenever more complete treatment than that provided for by the settling tank shall be required, and that there is sufficient head to operate the supplementary filters by gravity flow.

From our careful examination of the plans the proposed sewer system if modified in accordance with the recommendations contained in the body of this report and the sewage disposal plant if properly constructed and operated with care and efficiency should provide satisfactory means for sewerage and sewage disposal for the proposed sewer district.

I would therefore recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the proposed sewage disposal plant into Oriskany creek on condition that the screening chamber be installed at the upper end of the proposed inverted siphon.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to sewer commissioners of Hamilton College sewer district to discharge effluent from the settling tank of the sewage disposal plant to be constructed in connection with the proposed sewer system into the waters of Oriskany creek, near College street, within the town of Kirkland in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

According to the report of the designing engineer it is proposed to use 100 pounds of hypochlorite per million gallons. This is equal to about 4 parts of available chlorine per million and should be sufficient to disinfect sprinkling filter effluent if properly applied.

The sludge from the preliminary settling tank is to be disposed of on a sludge bed having a superficial area of 625 square feet. This bed is to be filled to a depth of from 12 to 18 inches with graded stone ranging in size from 3 inches at the bottom to 1/6 inch at the top. The surface is to be covered with a ¼-inch layer of coarse mortar sand. The liquid that drains from the sludge bed is to be passed through a final settling tank before its discharge into the stream.

In conclusion I would state that it appears from our careful examination of the plans that the proposed sewer system and sewage disposal works have been carefully designed. As noted above the sewer system should satisfactorily meet the present and future needs of the sewer district. The disposal plant is found to be well balanced and should satisfactorily meet the present needs of the district and allow for a reasonable growth in the future. A satisfactory effluent should be produced by the plant if properly constructed in accordance with the plans and if operated with care and efficiency.

I would therefore recommend that the plans be approved and a permit be issued allowing the discharge into Beaver Swamp brook of effluent from the proposed sewage disposal plant.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the sewer commissioners of sewer district No. 1, town of Harrison, to discharge effluent from the sewage disposal plant to be constructed in connection with the proposed sewer system in said sewer district into the waters of Beaver Swamp brook opposite Gleason street within the town of Rye in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge from any part of the disposal works shall be discharged into Beaver Swamp brook, or any other watercourse or body of water.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

October 2, 1912

7. Plan and sections of settling basins and sludge tanks.
8. Details of appurtenances of the sewer system.
9. Seven sheets of profiles on tracing cloth, not in duplicate.

The proposed sewer district is situated in the southern part of the town of Harrison on Beaver Swamp brook, a tributary of Mamaroneck harbor. It is provided with a public water supply and a number of private sewers have been constructed in the districts which discharge into Beaver Swamp brook.

The population of the district to be served, according to the report of the designing engineer submitted in 1910, was approximately 2,500 at that time. The present population of the district to be served by the proposed sewers is probably about 3,000 and the area of the section of the town shown by the general plans is about 1,300 acres, giving an average density of population of about 2½ persons per acre over the entire area. Based on the assumed density of population of 20 persons per acre it is estimated that the population ultimately to contribute sewage from the territory shown by the plans will be approximately 24,000, although the designing engineer in his report states that it will ultimately reach some 32,000.

According to the plans the area shown is naturally divided into three drainage districts which may be designated as the western, central and eastern districts. Although the sewers in the western district which are naturally tributary to the Mamaroneck river are not to be constructed in the near future, the sewers in West and other streets in this district are nevertheless shown in detail upon the plans and it is understood from the report of the engineer that arrangements will probably be made with the village of Mamaroneck for discharging the sewage from these sewers or a separate sewage disposal plant may be installed near the Mamaroneck river.

The central district, which may also be designated as the high level district, comprises an area of some 430 acres and is divided into two sections by the N. Y., N. H. & H. R. R., which extends through this district from east to west. The sewage of this district as well as that of the western or low level district, which latter comprises an area of some 124 acres and a portion of which extends into the town of Rye, is to be conveyed by gravity flow to a proposed pumping station at the sewage disposal plant near the intersection of two branches of Beaver Swamp brook where all of the sewage is to be pumped.

The plans have been carefully examined with respect to the sewer system and sewage disposal works. In connection with the sewer system the design has been carefully studied with reference to alignments, sizes, grades, capacities, facilities for cleaning and inspection and flushing and other features of an hydraulic or sanitary nature of the proposed sewers. In connection with means for sewage disposal it has been studied with reference to the general method and efficiency of the sewage disposal works as a whole and of the capacities and practical operation of the individual structures, appurtenances and apparatus.

The proposed sewers are to vary in size from 6 to 15 inches in diameter and flush tanks are to be installed at the upper ends of lateral sewers with slopes of less than 1 per cent. Manholes are to be constructed at all points of change of slope or alignment and at intermediate points on straight alignment of the sewers at intervals of not more than 500 feet in order to facilitate cleaning and inspection.

It is found that in general the slopes of the larger size sewers are to be sufficiently steep to produce self-cleansing velocities in them under ordinary conditions. There are, however a large number of sections of 6-inch sewer with slopes of less than .6 per cent., some of which are as flat as .4 per cent., as in Spring, West, Second, Purdy and other streets. The slopes of these sewers should either be increased to not less than .6 per cent. or the size of the sewers should be increased to 8 inches in diameter in order to secure self-cleansing velocities in these sewers.

It is found from our examination of the plans that although the lateral sewers for the most part have sufficient capacity to care for the probable future maximum rate of flow of sewage of the sections to be served by them, based on an estimated future population of 20 persons per acre con-

sewers on condition that detailed plans for the preliminary treatment of the entire sanitary sewage of the village, together with general plans for supplementary or more complete treatment of such sewage, be submitted for approval on or before February 1, 1913.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the municipal commission of the village of Herkimer to discharge sewage from the proposed sewer extensions in West German, West Steele and other streets into the waters of the Mohawk river through the existing outfall sewer within the municipality of Herkimer, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That on or before February 1, 1913, satisfactory detailed plans for preliminary purification or clarification by sedimentation of the entire sanitary sewage of the village of Herkimer accompanied by general plans for additional or supplementary works for more complete treatment of the sewage shall be submitted to this Department for approval; and that after approval of said plans such works for preliminary treatment of such sewage shall be constructed and put in operation within the time limit then specified.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

September 27, 1912

HOBART

On February 8, 1912, the following certificate of approval of the proposition of the board of trustees of Hobart to temporarily omit from construction certain portions of the sewer system of the village for which plans were approved by this Department on November 28, 1911, was issued.

ALBANY, N. Y., *February* 8, 1912.

To the Board of Trustees of the Village of Hobart:

GENTLEMEN: — In response to the application made to me by your board under date of January 23, 1912, asking for my approval of the temporary omission from construction of a portion of the permanent general system of sewers and sewage disposal for the village of Hobart, plans for which were approved by this Department on November 28, 1911, I hereby certify my determination to approve and do approve of such temporary omission from construction, until in the judgment of the State Commissioner or of the board of trustees of the village of Hobart such portions may be necessary, of certain portions of said system of sewers and sewage disposal, to wit:

filtrations. Siphons designed so as to draw about 6 inches and so arranged that the sewage may be drawn off from either compartment of the settling tanks and to be located at the outlet end of the tank are to be connected with the distributing system of the sprinkling filters.

In accordance with the report of the designing engineer the effluent from the siphons is to be controlled by head regulating valves which will cause the head on the filters to drop from the maximum to any desired point and although no details of these siphons are shown it is assumed that a varying head on the nozzles will be produced so as to give a uniform distribution of the effluent over the surface of the filter beds.

The proposed filter is to be divided into two units which will be filled to a depth of 5½ feet with broken stone varying in size from ¾ of an inch to 2 inches in diameter. The two units have sufficient capacity to give an average rate of operation of 2,000,000 gallons per acre per day on the basis of design used. The effluent from the sprinkling filter is to be passed through a final settling basin where a time of detention of about 2 hours may be obtained before the sewage is discharged into the streams.

The sludge from the settling tanks is to be discharged to a covered sludge tank which is to be filled to a depth of 10 inches with broken stone over which is to be placed an 8-inch layer of sand for filtering material. The filtered effluent from the sludge bed is to be passed through drains laid with open joints which will allow it to filter through the soil before it reaches the brook.

In conclusion I would state that it is found from our careful examination of the plans that the proposed sewage disposal plant if properly constructed in accordance with the plans and operated with care and efficiency should produce an effluent which may be safely discharged into Beaver Swamp brook without objection at this time. The plans for the proposed sewer system, however, should be revised before the final acceptance of them.

I would therefore recommend that the plans be returned to the sewer commissioners of the town of Harrison for revisions or modifications in accordance with the recommendations embodied in this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *September* 30, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of amended plans for sewerage and sewage disposal for sewer district No. 1 in the town of Harrison, Westchester county, which were recently submitted to this Department for approval by the sewer commissioners.

Original plans for a proposed sewer system and sewage disposal plant were submitted for your approval by the sewer commissioners on September 12, 1912, and after a careful examination of them by the Engineering Division a report was submitted to you under date of September 25 setting forth the results of this examination and making recommendations for certain revisions of the plans before the final acceptance of them.

The plans recently submitted and now under consideration were prepared by Alex. Potter, consulting engineer of New York city, and comprise tracings and blue prints of the following:

(1) General plan of the proposed sewer district and vicinity showing sewerage system and tentative location of sewage disposal works.
(2) Plan of Harrison avenue sewer extension.
(3) Nine sheets of profiles of the proposed sewer.
(4) Plan showing details and appurtenances.
(5) Plan showing details of manhole cover.
(6) Plan showing details of lock, manhole cover.
(7) General plan of sewage disposal works.
(8) Profile through the sewage disposal works.

(9) Plan and sections of screen chamber.
(10) Plan and sections of settling tank.
(11) Plan and details of pumping station.
(12) Plans and details of dosing chamber.
(13) Plan and details of sprinkling filter.
(14) Plan and details of final settling tanl
(15) Plan and details of sludge bed.

Duplicate copies of report and specifications wer
From our careful examination of the plans it
tionable features of the design of the proposed se
the original plans are eliminated by the plans no
no sewers are shown in the district west of the
near the Mamaroneck river. The present plans co
territory as shown by the original plans.

Eight-inch sewers have been substituted in the
sewers shown by the original plans and the propos
structed with slopes sufficiently steep to produce s
them under ordinary conditions. Whereas the origi
main trunk sewer from the disposal plant to a poin
varied in size from 8 to 15 inches in diameter an
.4 to .2 per cent., the present plans provide for an 18
covering the same route and having slopes of .2 pe
respectively. The upper portion of the trunk sewer
Ellsworth avenue and Calvert street is to be 20 ir
to be laid with a slope of .11 per cent. A flush ta
1,500 gallons is to be constructed at the upper en
and it is the intention of the design to flush the t
level district by means of this tank once a day.

The construction of the proposed trunk sewer on
in raising the lower end of the trunk sewer so as
of this district being passed through a disposal pla
capacity of the trunk sewer has also been increased
day when flowing full which would be adequate fo
the district.

The size of the proposed outfall sewer for the lov
of the sewer district has been increased to 12 incl
have a capacity of about 970,000 gallons per day
should be adequate to meet the ultimate future maxi
of sewage to be served by it.

It is found from our careful examination of the
sewer system should satisfactorily care for the prol
of sanitary sewage from the sewer district shown by
in the construction the sewers be made sufficientl
excessive infiltration of ground water.

It is proposed to treat the sewage from this syst
plant to be located a short distance from the site sho
This plant is to consist of a screening chamber, Imh
final settling tank, sterilization plant and an auxi
disposal of sludge.

Although the sewage from the low level district
sewage from the high level district is to be passed th
by gravity flow. The sewage from the low level di
disposal works is to be passed through a screen cha
the proposed pumping station. This chamber is to
partments each of which is to be 3 feet wide by
provided with a bar screen composed of ¾ by 1 inc
the clear.

The screened sewage is then to flow into a pum
compartments having a combined capacity of about
proposed operating conditions however, the sewage i
outfall sewer and the amount of sewage to be pum
will consequently be materially increased. It is prop

by means of two 5-inch centrifugal pumps to be located in a dry well adjacent to the pump well. Each pump is to be driven by an automatically operated electric motor and will have a capacity of 750,000 gallons per day when operating against a head of 21 feet, and each pump will therefore be capable of handling the assumed ultimate flow. In the case of a break down in the pumping equipment the sewage from the pump well will be discharged into the mixing channel of the final settling tank, where it will be treated with hypochlorite of lime and subjected to a short sedimentation before its discharge into the stream.

The sewage from the pumps as well as that from the high level district is to be discharged through a 12-inch pipe into the distributing trough of the proposed settling tank in which is also to be placed a screen chamber provided with a bar screen composed of 1-inch by ¼-inch bars spaced 1¼ inches in the clear for the purpose of screening the sewage from the high level section.

The proposed settling tank is to be a horizontal flow tank of the Imhoff type and is to be divided into an upper or settling compartment for the clarification of sewage and a lower or sludge compartment for the storage and digestion of sludge. The settling compartment has sufficient capacity to give about 3½ hours' detention of sewage contributed by the estimated present population of 3,000 persons on the usual assumptions as to per capita rate of sewage contribution. The capacity of the sludge compartment located below the settling compartment and separated from it by means of a reinforced concrete partition has a capacity equal to about 33 per cent. of the total effective capacity of the settling tank. A sludge pipe provided with a bell mouth and which extends to a point near the lower portion of the sludge compartment is to be provided for the purpose of drawing off the sludge and discharging it into the adjacent sludge bed.

The clarified sewage from the settling tank will be discharged through 12-inch pipe to the dosing chamber provided with a 14-inch discharge siphon. This chamber is a hexagonal reinforced concrete structure with a pyramidal bottom and in connection with the discharge siphon and distributing system should tend to produce a uniform distribution of the clarified effluent over the surface of the sprinkling filter. Provisions are also made for by-passing the dosing tank and filters and discharging settling tank effluent into the mixing channel of the final settling tank.

The proposed sprinkling filter which is to be filled to a depth of from 6 to 6½ feet with broken stone, ranging in size from 1½ to 3 inches in diameter, is to have a superficial area of about .2 acres and will be required to operate at the rate of 1,500,000 gallons per acre per day when treating the sewage contributed by the present estimated population of 3,000. The effluent is to be applied to the surface of the filter through circular distribution nozzles spaced 13 feet apart on centers. There will be a maximum head of 7.25 feet on the nozzles.

The underdrain system of the sprinkling filter is to consist of four 15-inch channels spaced 26 feet apart. Ventilators are to be installed at each end of the main collecting drain for the purpose of aeration and although it would also be desirable to provide a false bottom for the sprinkling filter in order to facilitate drainage and ventilation satisfactory results will probably be obtained if somewhat larger stones than those provided for by the specifications be placed around and between the underdrains.

The effluent from the sprinkling filter after passing through the mixing channel where a solution of hypochlorite is to be applied is to be passed through the final settling tank divided into two compartments. This tank has a total capacity of 27,000 gallons which will furnish a time of detention of about 2 hours when serving the present population. The sludge which accumulates in this tank is to be drawn off through an 8-inch pipe to the pump well from which it is to be discharged into the preliminary settling tank.

The hypochlorite plant which is to be located in the pumping station is to consist of mixing solution, with automatic feed tanks. Mechanical agitation is to be provided for both the mixing and solution tanks.

According to the report of the designing engineer
100 pounds of hypochlorite per million gallons. This
parts of available chlorine per million and should be
sprinkling filter effluent if properly applied.

The sludge from the preliminary settling tank is to
sludge bed having a superficial area of 625 square feet
filled to a depth of from 12 to 18 inches with graded
from 3 inches at the bottom to 1/6 inch at the top. The
ered with a ¼-inch layer of coarse mortar sand. The liq
the sludge bed is to be passed through a final settling tank
into the stream.

In conclusion I would state that it appears from our
of the plans that the proposed sewer system and sewage
been carefully designed. As noted above the sewer sy
factorily meet the present and future needs of the sewer
posal plant is found to be well balanced and should sati
present needs of the district and allow for a reasonable gr
A satisfactory effluent should be produced by the plant if p
in accordance with the plans and if operated with care a

I would therefore recommend that the plans be appro
be issued allowing the discharge into Beaver Swamp broo
the proposed sewage disposal plant.

Respectfully submitted,

THEODORE

PERMIT

Application having been duly made to the State Commissi
as provided by section 77 of chapter 49 of the Laws of 19(
Health Law," as amended by chapter 553 of the Laws of 19
chapter 45 of the Consolidated Laws, permission is hereby
sewer commissioners of sewer district No. 1, town of Harriso
effluent from the sewage disposal plant to be constructed in c
the proposed sewer system in said sewer district into the wa
Swamp brook opposite Gleason street within the town of Rye
with the plans accompanying the petition, under the following c

1. That this permit shall be revocable at any time c
modification or change when in the judgment of the State
of Health such revocation, modification or change shall beco

2. That the issuance of this permit shall not be deemed
any way action by this Department on any future applicati
be made for permission to discharge additional sewage or
the waters of this State.

3. That both the sewer system and the sewage disposal w
by plans approved this day shall be fully constructed in co
formity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm
surface water from streets, roofs or other areas shall be admi
proposed sewers.

5. That no sewage sludge from any part of the disposal w
be discharged into Beaver Swamp brook, or any other wate
body of water.

ALEC H. SEYMOUR
Acting State Commissioner of

October 2, 1912

The distributing system, consisting of two 6-inch main distributors and 460 feet of 3-inch laterals placed at a depth of 18 inches below the ground surface, is to be located partially in excavation and partially in fill. The filling material through which the effluent is to percolate is to have a maximum depth of 7 feet and is to consist of coarse sand and gravel. Valves are to be provided at the head of the distributing system which is to be so arranged that either portion of the irrigation field may be used at a time. The purified effluent is to flow into Huntington harbor through 6-inch weep holes in the retaining wall or bulkhead.

The proposed irrigation field has sufficient area to provide for a rate of operation of about 20,000 gallons per acre per day on the assumptions as to sewage contribution used above and it appears from our careful examination of the plans that the proposed sewage disposal plant if operated with care and efficiency should produce an effluent which may be safely discharged into Huntington harbor at the present time without objection. I am of the opinion, however, that no portion of the distributing system of the irrigation field should be laid within 10 feet of the retaining wall through which the treated effluent is to flow.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into Huntington harbor of effluent from the proposed sewage disposal plant on condition that no portion of the distributing system shall be less than 10 feet from the bulkhead or retaining wall.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Mr. M. L. Scudder to discharge effluent from the sewage disposal plant to be constructed near his residence at Halesite, town of Huntington, Suffolk county, into the waters of Huntington harbor near his residence within the town of Huntington, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans, except that no portion of the subsurface tiling shall be laid at points less than 10 feet from the bulkhead or retaining wall.
4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge from any part of the disposal works shall be discharged into Huntington harbor or any other stream or body of water.

EUGENE H. PORTER,
State Commissioner of Health

August 13, 1912

sewers on condition that detailed plans for the p
the entire sanitary sewage of the village, together
supplementary or more complete treatment of such
approval on or before February 1, 1913.

Respectfully submitted,
THEC

PERMIT

Application having been duly made to the State Co
as provided by section 77 of chapter 49 of the Laws
Health Law," as amended by chapter 553 of the Law
chapter 45 of the Consolidated Laws, permission is
municipal commission of the village of Herkimer to d
the proposed sewer extensions in West German, West St
into the waters of the Mohawk river through the e
within the municipality of Herkimer, in accordance w
panying the petition, under the following *conditions:*

1. That this permit shall be revocable at any
modification or change when in the judgment of the
of Health such revocation, modification or change sha
2. That the issuance of this permit shall not be
any way action by this Department on any *future* a
be made for permission to discharge additional sewa
the waters of this State.
3. That only sanitary or domestic sewage, *and n*
surface water from streets, roofs or other areas sha
the proposed sewers.
4. That on or before February 1, 1913, *satisfactory*
preliminary purification or clarification by sedimentat
sanitary sewage of the village of Herkimer accompanied
for additional or supplementary works *for more compl*
the sewage shall be submitted to this Department fo
that after approval of said plans such works for *prelim*
of such sewage shall be constructed and put in opera
time limit then specified.

ALEC H. SEY
Acting State Commission

September 27, 1912

HOBART

On February 8, 1912, the following certificate of approval of t
of the board of trustees of Hobart to temporarily omit from
certain portions of the sewer system of the village for whic
approved by this Department on November 28, 1911, was issued

ALBANY, N. Y., *Februar*

To the Board of Trustees of the Village of Hobart:

GENTLEMEN: — In response to the application made to me by
under date of January 23, 1912, asking for my approval of the
omission from construction of a portion of the permanent gene
of sewers and sewage disposal for the village of Hobart, plans for
approved by this Department on November 28, 1911, I hereby c
determination to approve and do approve of such temporary omis
construction, until in the judgment of the State Commissioner
board of trustees of the village of Hobart such portions may be
of certain portions of said system of sewers and sewage disposal, t

(1) On Cemetery street, V. & D. R. R. Station 5 plus 90 on the profile map to Station 10, a distance of 410 feet.

(2) On Cemetery street from Maple Park street, Station 20 plus 36 to corporation line Station 28 plus 38, distance 802 feet.

(3) On Maple street from watering trough, Station 18 plus 50 to corporation line, Station 23 plus 50, distance 500 feet.

(4) On St. Peters street from Station 4 plus 50 to Station 9 plus 80, distance 530 feet.

The above approval is duly given on this 8th day of February, 1912, under the provisions of section 260, article 11 of chapter 64 of the Consolidated Laws, the Village Law.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

HUDSON

On January 12, 1912, application was made by the commissioner of public works for the approval of plans for proposed sewer extensions in East Court street and Power avenue. The plans were approved on February 1, 1912, and a conditional permit was granted to the city authorities on the same date allowing the discharge, into a small stream tributary to South bay and the Hudson river, of sewage to be collected by the proposed sewers. The permit and the report on the examination of the plans follow.

ALBANY, N. Y., *January 25, 1912.*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed sewer extension in the city of Hudson, Columbia county, submitted to this Department for approval by the commissioner of public works on January 12, 1912.

The report of the public sewer system of the city of Hudson submitted in accordance with chapter 468 of the Laws of 1903 shows that sewers, largely on the combined plan, have been constructed in that city from time to time since about 1871. Prior to the submission of plans now under consideration no plans for sewerage have been submitted to or approved by this Department.

The plans now under consideration show that it is proposed to intercept the sewage carried by the existing 24-inch combined sewer in East Court street at a point about midway between Power avenue and the Boston and Albany railroad tracks by means of a 24-inch sewer and to carry it down East Court street to Power avenue. From this point the sewer is to be 30 inches in diameter with a slope of from 2 to 4 per cent. and is to discharge into a culvert which carries a small stream under Power avenue about 150 feet west of South Third street and some 150 feet from South bay, an arm of the Hudson river, into which this stream discharges. The sewage from the proposed sewer in East Court street is at present discharged into this stream at a point near Court street, some 1,200 feet above the proposed point of discharge. This stream flows parallel to Power avenue for a distance of about 1,000 feet between East Court and South Third streets.

Although South bay receives considerable pollution at present it appears that the proposed sewer extension will not materially increase the amount of sewage which is now being discharged into the bay and that it will tend to relieve somewhat any insanitary conditions which may exist along the steam between East Court street and South Third street, referred to above, by changing the point of discharge of the sewer in East Court street to a point near the outlet of the stream.

The question, however, of the future disposal of sewage of the municipalities along the Hudson river is a very important matter and one that has been seriously considered during the past few years. It has been your consistent policy that in all future sewer construction in this State consideration should

be given to the future disposal of sewage, especially wl plies are involved.

The conditions of pollution of the Hudson river with local pollution and the protection of the city of Hudsor upon municipalities below Hudson are such that in r necessary that the city of Hudson make a comprehensiv tion at once of a plan for the interception of the sewage of the possible and most appropriate means for the tre. and present the same to this Department at an early da

I would therefore recommend that the plans be appro issued allowing the discharge of sewage to be collected by into the stream tributary to the Hudson river on con plans for preliminary treatment of the entire sanitary se gether with general plans for supplementary or more cor such sewage, be submitted for approval on or before Febr

Respectfully submitted,

THEODORI

PERMIT

Application having been duly made to the State Commiss as provided by section 77 of chapter 49 of the Laws of 1 Health Law," as amended by chapter 553 of the Laws of 1 chapter 45 of the Consolidated Laws, permission is hereby gi mission of public works of the city of Hudson to discharge s proposed sewer extensions in East Court street and Power a waters of a small stream tributary to South bay and the Huds point shown by the plans within the municipality of Hudson with the plans accompanying the petition, under the following

1. That this permit shall be revocable at any time or su fication or change when in the judgment of the State Co Health such revocation, modification or change shall become

2. That the issuance of this permit shall not be deemed to way action by this Department on any future application made for permission to discharge additional sewage or efflu waters of this State.

3. That on or before February 1, 1913, there shall be subm Department for approval satisfactory plans as follows: (A intercepting or outfall sewers to convey the entire sanitary se city of Hudson to a suitable site for sewage disposal works.

(B) Detailed plans providing for preliminary treatment of sanitary sewage of the city of Hudson by screening and sed or septic action.

(C) Plans showing the location, general arrangement and typ tional works for complete treatment of the sewage.

4. That upon approval of said plans and whenever required by Commissioner of Health the intercepting and outfall sewers and t for partial treatment of sewage shall be constructed and put in c within a time limit then specified.

5. That whenever required by the State Commissioner of Healt factory detailed plans for additional works for more complete tr of the sewage of the city of Hudson shall be submitted for approv upon approval of said plans any or all portions of such additional plementary works for more complete treatment of sewage shall structed and put in operation at such time or times thereafter a Commissioner may designate.

EUGENE H. PORTER,
State Commissioner of Hea

February 1, 1912

HUNTINGTON (M. L. Scudder)

Plans for sewage disposal for the residence of Mr. M. L. Scudder at Halesite in the town of Huntington were submitted for approval on May 3, 1912. The plans were returned for revision on May 23 and were resubmitted for approval on August 6, 1912. The plans revised in accordance with the recommendations of this Department were approved on August 13 and a permit was issued on the same day allowing the discharge, into Huntington harbor, of effluent from the proposed sewage disposal plant consisting of a settling tank and subsurface irrigation system. The permit and report on the examination of the plans follow.

ALBANY, N. Y., *May* 22, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewage disposal for the residence of Mr. M. L. Scudder at Huntington, L. I., which were recently submitted to this Department for approval.

It appears from a letter from Mr. Scudder transmitting the plans that the proposed disposal plant which is intended to treat the overflow from a cesspool is to be located opposite his property at a pier in Huntington harbor some 50 feet from the water's edge, and that the effluent from the proposed plant is to be discharged into gravel at the pier. No data, however, is submitted as to the number of persons to be served by it.

The plans provide for a concrete tank to be divided into four compartments, two of which are to be filled to a depth of about 6 feet with graded gravel varying in size from 1/8 inch to 1 1/2 inches and through which the effluent is to flow.

The overflow from the cesspool which is not shown by the plans, is to flow into the first compartment of the proposed disposal plant through 8-inch pipe. This compartment which is to be 4 feet by 5 feet in cross section and about 6 1/2 feet deep has sufficient capacity to give an average time of detention of sewage of about one day when serving ten persons contributing sewage at usually assumed rate. This flow, however, is merely an assumption used as a basis of comparison inasmuch as the population to be served is not given.

From the first compartment the sewage is to flow through submerged outlet into perforated copper distributing troughs placed in the second compartment which is to be filled with gravel and through which the effluent is to percolate. After passing through the gravel of this chamber the effluent is to flow into a third narrow compartment through fifteen 2-inch by 8-inch openings located in and near the bottom of the partition wall between these two compartments and after passing up through this narrow compartment it is to flow in four 4-inch wood fibre pipes which are presumably to be used for the purpose of distributing the effluent over the surface of the gravel in the fourth and last compartment and from which the effluent is to be discharged through submerged outlet.

From our careful examination of the plans it would appear that except for the sedimentation obtained in the first compartment very little if any purification of the sewage would result from the proposed plant as designed and that it would in all probability create a nuisance owing to lack of aeration and improper operation due to the continuous flow of sewage through the plant. Moreover the coarse grained filters constituting two of the four compartments are not to be underdrained and it is evident that they are neither trickling filters nor contact beds.

If it is desired to operate the filters as trickling filters it would be necessary to install a properly constructed dosing tank provided with one or more automatic siphons discharging into a distributing system provided with sprinkling nozzles and the beds should be properly underdrained so as to facilitate draining them. On the other hand, if it is proposed to operate the filters as contact beds they should be provided with automatic dosing and time discharge siphons so arranged that the effluent from the settling tank may be delivered to the different units of the contact beds in doses equal

has not yet been completed owing to unavoidable delays, it would seem reasonable to grant an extension of the time for submitting plans for sewage disposal for the city.

In view of the results of the examination of the plans now before the Department and in view of the foregoing discussion as to the submission of plans for sewage disposal, I beg to recommend that the plans for the Thyneville trunk sewer be approved and that a permit be issued allowing the discharge of sewage into Cayadutta creek, which permit shall contain, in addition to the usual revocation and modification clauses, the provision that on or before March 1, 1913, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city of Johnstown shall be submitted for approval.

This would constitute an extension of the time for filing plans for sewage disposal for the city and I would suggest that the city authorities be advised that the requirements must be met within the time limit stated and that no further extensions can be granted.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Johnstown to discharge sewage from the Thyneville trunk sewer into the waters of Cayadutta creek, at the point shown by the plans within the town of Johnstown, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That on or before March 1, 1913, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city of Johnstown shall be submitted for approval.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

May 15, 1912

ALBANY, N. Y., *May* 28, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed sewer extension in the city of Johnstown, submitted to this Department for approval.

These plans were first presented on May 20, 1911, but the approval of them has been withheld pending the compliance by the city with the permits issued by this Department in connection with the approval of plans for sewer extensions of the city under date of June 15, 1910, and subsequent dates which required "that on or before June 1, 1911, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city shall be submitted for approval."

The distributing system, consisting of two 6-inch main distributors and 460 feet of 3-inch laterals placed at a depth of 18 inches below the ground surface, is to be located partially in excavation and partially in fill. The filling material through which the effluent is to percolate is to have a maximum depth of 7 feet and is to consist of coarse sand and gravel. Valves are to be provided at the head of the distributing system which is to be so arranged that either portion of the irrigation field may be used at a time. The purified effluent is to flow into Huntington harbor through 6-inch weep holes in the retaining wall or bulkhead.

The proposed irrigation field has sufficient area to provide for a rate of operation of about 20,000 gallons per acre per day on the assumptions as to sewage contribution used above and it appears from our careful examination of the plans that the proposed sewage disposal plant if operated with care and efficiency should produce an effluent which may be safely discharged into Huntington harbor at the present time without objection. I am of the opinion, however, that no portion of the distributing system of the irrigation field should be laid within 10 feet of the retaining wall through which the treated effluent is to flow.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into Huntington harbor of effluent from the proposed sewage disposal plant on condition that no portion of the distributing system shall be less than 10 feet from the bulkhead or retaining wall.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Mr. M. L. Scudder to discharge effluent from the sewage disposal plant to be constructed near his residence at Halesite, town of Huntington, Suffolk county, into the waters of Huntington harbor near his residence within the town of Huntington, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans, except that no portion of the subsurface tiling shall be laid at points less than 10 feet from the bulkhead or retaining wall.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into Huntington harbor or any other stream or body of water.

August 13, 1912

EUGENE H. PORTER,
State Commissioner of Health

ILION

Plans for sewage disposal works for the village of
June 25, 1912, and a permit was issued to the board
of the village allowing the discharge into the Mohaw
the proposed sewage disposal works consisting of sc
station, settling tank and auxiliary sludge drying bed
a permit was issued to the village authorities extendi
struction of the sewage disposal works. The permits
on the examination of the plans follow.

ALBANY,

EUGENE H. PORTER, M.D., *State Commissioner of Heal*

DEAR SIR: — I beg to submit the following report on a
for sewage disposal for the village of Ilion, Herkimer co
mitted to this Department for approval on May 21, 191

It appears from the records of this Department that
comprehensive sewer system, pumping station and sewage
approved by the then State Board of Health on January
on August 25, 1893, amended plans were approved showi
ment of the outfall sewer and changes of location of the se
On January 16, 1894, amended plans providing for changes
and grades of certain sewers in the village in such a w
pumping of the sewage and thereby converting the entire sy
into a gravity system were approved.

In 1910 and 1911 plans for extensions of the village sewe
proved and the permits issued in connection with the appro
contain in addition to the usual revocation and modificatio
lowing conditions:

> 1. That on or before January 1, 1912, detailed plans
> mentation or septic tanks to treat the sanitary sewage
> Ilion which shall meet the requirements of this Departm
> by general plans for more complete treatment of the sew
> mitted to this Department for approval.
>
> 2. That the said settling, sedimentation or septic tank
> structed and put in operation by September 1, 1912.
>
> 3. That whenever required by the State Commissioner
> tailed plans for such additional works for more complete t
> sewage of the village shall be submitted for approval and
> portions of said additional or supplementary works for
> treatment of the sewage of the village shall be construct
> operation when required by the State Commissioner of He

The plans now under consideration were submitted in accord
above requirements and were prepared by Chas. C. Hopkins, civi
Rochester, N. Y.

The village of Ilion which has a population of about 7,000 per
ing to the census of 1910, is situated in the northwestern part of
German Flats on the south side of the Mohawk river. It is pro
filtered water supply and the water works are controlled by the m
The village is provided with a comprehensive sewer system ser
cally the entire village and discharging into the Mohawk river
municipality through a 20-inch outfall sewer at the foot of East
tended.

It appears from the report of the designing engineer that, ac
gaugings of the flow of sewage made during February of this year,
mum flow varies from 2,000,000 to 2,200,000 gallons per day, of w
1,300,000 to 1,400,000 gallons are estimated to be ground water.

It is proposed to treat the sewage collected by this system in a se
posal plant located near the outfall sewer between the West Shore
and the Mohawk river. This stream has a drainage area above this
about 850 square miles and has a large urban and rural populatio
watershed. The city of Utica which is located about 10 miles above I

a population of about 75,000 and the villages of Frankfort and Mohawk having populations of about 3,000 and 2,000, respectively, are located on either side of the village and within a mile of it.

The Mohawk river has an average flow during the summer of from about 195 to 390 cubic feet per second and it is evident that with a large increasing population on the watershed of this river no additional sewage should be discharged into it without proper treatment and that steps should be taken to remove as far and as rapidly as possible the pollution which now enters the river.

The Mohawk river at the disposal plant is to be canalized and will form part of the Barge canal which is now under construction by the State of New York. According to the report of the designing engineer the normal pool level of the proposed canal will be at an elevation of 383 feet above sea level, and the invert elevation of the outfall sewer at the intersection of East and River streets is 384.36, and at the disposal plant 379.4, so that it would probably be impracticable to so locate the disposal plant as to permit of its operation by gravity except at low water periods of the canal and river. The pool level of the canal, moreover, will probably vary as much as 10 feet or more at extraordinary high water stages. It is proposed to pump the sewage after screening into the proposed settling tanks the flow lines of which are to be at elevation 400.5, so that the normal operation of the plant will not be interfered with by high water and there will also be sufficient head to operate supplementary treatment works whenever such works are constructed.

The plans provide for a sewage disposal plant consisting of a screen chamber, pumping station, settling tank and an auxiliary sludge bed for the disposal of sludge. General plans are also shown for more complete sewage disposal works consisting of dosing tank and sprinkling filters to be constructed whenever supplementary or more complete treatment of the sewage than that provided for by the detailed plans shall be required.

The sewage upon reaching the sewage disposal plant is to be passed through the screen chamber provided with a bar screen composed of ¾ inch by 1½ inch bars spaced 1½ inches apart on centers. A by-pass controlled by a stop valve is also provided at the diverting manhole near the screen chamber by means of which the sewage may be by-passed directly to the river in case of emergency and the water from the river prevented from setting back into the screen and pump well at high water stages.

From the screen chamber the sewage is to flow into a pump well of a housed pumping station which is to be equipped with two automatically operated and electrically driven centrifugal pumps by means of which the sewage is to be discharged into two settling tanks so arranged that either or both tanks may be used at the same time.

The settling tanks are to be circular horizontal flow tanks of the Imhoff or Emscher type about 30 feet deep and will provide for a depth of liquid of 28 feet. Each tank is to be divided by means of reinforced concrete partition walls into an upper or settling compartment provided with a double bottom with parallel slats for the passage of suspended matter, and into a lower or sludge compartment for the storage and decomposition of sludge. The settling compartments have sufficient capacity to provide for an average time of detention of about 2 hours when caring for the present flow of sewage including ground water infiltration which according to the report of the designing engineer is equal to about twice the flow of sanitary or domestic sewage.

The sludge from the sludge compartment of the settling tank is to be discharged by gravity flow through 8-inch wrought iron pipes to an adjacent sludge bed which is to be 100 feet by 60 feet in plan. This bed is provided with 4-inch underdrains discharging into a 10-inch collecting drain through which the effluent from the sludge bed is to flow back into the screen chamber and pump well and passed through settling tanks for further treatment.

In conclusion I would say that it appears from our examination of the plans that the proposed sewage disposal plant, if properly constructed and operated with care and efficiency, should furnish an effluent which may safely be discharged into the Mohawk river at the present time without objection

to be of the Taylor square distributor type. The bed is composed of 7 feet of broken stone 1 inch to 2½ inches in greatest dimension.

The changes proposed by the plans were made necessary principally by the local conditions being unfavorable to the proper disposal of sludge from tanks of the Dortmund type and by the desirability of increasing the sprinkling filter area to the full area shown by the original plans for the final size of the filter.

Our careful examination of these plans indicates that these alterations and additions have been designed with careful attention to essential requirements such as to method of treatment, capacity and facility of convenient operation; and it is my opinion that if the work of construction is carried out in accordance with these plans, and the plant is operated efficiently, a sanitary disposal of the sewage of the institution will be effected.

I beg to recommend, therefore, that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

LARCHMONT

On April 4, 1912, the following permit was granted to the board of trustees of the village of Larchmont.

In the Matter of the application for an extension of the time for submitting plans for sewage disposal for the village of Larchmont as required by the State Commissioner of Health in a permit for sewage discharge into Larchmont harbor issued under section 77 of the Public Health Law and dated June 13, 1911.

In response to a written application dated April 2, 1912, made on behalf of the board of trustees of the village of Larchmont by Mr. Clarence DeWitt Rogers, attorney for the village of Larchmont, and it appearing that said board has arranged for the preparation of plans for intercepting sewers and sewage disposal works for the village of Larchmont, but has found it difficult to have said plans completed before April 1, 1912, and being assured that said plans are in course of preparation, an extension of the time for filing said plans for intercepting sewers and sewage disposal works from April 1, 1912, to February 1, 1913, is hereby granted on this 4th day of April, 1912.

EUGENE H. PORTER,
State Commissioner of Health

This extension of the time for filing the plans for intercepting sewers and sewage disposal works for the village of Larchmont, constituting an amendment to the permit for sewage discharge granted June 13, 1911, to become operative must first be recorded in the county clerk's office of Westchester county.

LESTERSHIRE

Plan for the modification in the Lestershire sewer system and for sewer extensions in the Downsville sewer district of the city of Binghamton tributary to the Lestershire system were submitted for approval jointly by the board of trustees of the village of Lestershire and by the common council of the city of Binghamton on January 9, 1912. The plans were approved on January 17, 1912, and conditional permits were granted to the village and city authorities allowing the discharge, into the Susquehanna river, of sewage from the proposed sewers. For permits and report on the examination of the plans see Binghamton, page 426 of this report.

for sewer extension granted on December 2, 1910, and June 13, 1911, to be constructed and put in operation by September 1, 1912, and in consideration of the interference with the proposed work by the operations incidental to the construction of the barge canal, I hereby extend the time within which the said sewage disposal works shall be constructed and put in operation until such time as it shall be possible for your board to construct the said works on condition that the work of constructing the sewage disposal works shall be commenced as soon as possible.

Very respectfully,
ALEC H. SEYMOUR,
Acting State Commissioner of Health

August 28, 1912

ITHACA

Plans for sewer extensions in York and Fall streets in the city of Ithaca were submitted for approval by the Board of Public Works on July 3, 1912. The plans were approved on July 13, and a permit was issued to the city allowing the discharge, into Cayuga Inlet, of sewage from the proposed sewers after treatment in the city sewage disposal plant. The permit and the report on the examination of the plans are given below.

ALBANY, N. Y., *July 6*, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on examination of plans for proposed sewer extensions in the city of Ithaca, Tompkins county, which were submitted to this Department for approval by the Board of Public Works on July 3, 1912.

The plans show that it is proposed to construct six-inch sewers with slopes of 5/10 per cent. in York and Fall streets, between Tioga and Cayuga streets, a distance of some 450 feet. The proposed sewers which are tributary to the existing sewer in Cayuga street are to be provided with flush tanks at the upper ends of the proposed sewers and the intermediate manholes provide for spacing of not more than 250 feet between manholes or manholes and flush tank, which should produce adequate facilities for cleaning, inspection and flushings.

From our careful examinations of the plans it is found that the proposed sewers which are tributary to the existing sewer system and sewage disposal plant should satisfactorily care for the sanitary sewage of the districts to be served by them if properly constructed, and I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into Cayuga Inlet of sewage from the proposed sewers after the sewage shall first have been passed through the existing sewage disposal plant.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Board of Public Works of the city of Ithaca to discharge sewage from the proposed sewers in York and Falls streets into the waters of Cayuga Inlet through the outfall of city sewage disposal plant within the municipality of Ithaca in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the Waccabuc Inn Co. to discharge effluent from the proposed sewage disposal plant at Waccabuc Inn at Waccabuc Lake into the waters of a tributary of Cross river at the point of discharge shown by the plans within the town of Lewisboro in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge from any part of the disposal works shall be discharged into the artificial ditch tributary to the Cross river or any other water course.
6. That the amount of sewage to be passed through the sewage disposal plant is hereby limited to that contributed by 125 persons unless the capacity of such sewage disposal plant shall be increased in accordance with plans approved by this Department.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

June 13, 1912

LONG BEACH

Plans for a sterilization plant to be constructed in connection with the sewage disposal plant at Long Beach were submitted for approval on March 28, 1912, and on April 10, after a preliminary examination of these plans, they were returned for modifications, inasmuch as they were not in satisfactory condition for approval. The plans, revised in general accordance with the recommendations of this Department, were resubmitted for approval on August 28, 1912. The revised plans were approved on September 9, 1912, but no permit was issued in connection with their approval, inasmuch as they were submitted in compliance with the permit granted to the Long Beach Estates on March 16, 1910. The report on the examination of the plans follows.

ALBANY, N. Y., *September* 4, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for the proposed hypochlorite treatment plant for the Long Beach Estates at Long Beach, Long Island, which were submitted to this Department for approval on August 28, 1912.

Plans for a sanitary sewer system and for a sewage disposal plant for Long Beach were approved on March 16, 1910. The proposed disposal plant consisted of a settling tank of three compartments, having sufficient capacity to give about 6 hours' detention when serving 5,000 persons contributing sewage at the usually assumed rate and an 8-hour detention storage tank. It was the intention of the design to discharge the clarified effluent from the storage tank at high tide and allow a continuous flow to within

substantiated by the official map of the city on file in this office, which map indicates that a shorter and possibly a more economical route could be obtained by extending the sewer in Morris avenue to Seventh avenue, from Seventh avenue to South avenue and thence to Station 129, outside of the city limits.

It was, therefore, considered advisable to have an inspection of the route of the proposed sewer made by a representative of the Engineering Division as requested by a resident of the city of Johnstown. This inspection was made by C. A. Holmquist, Assistant Engineer in this Department, in company with Alderman W. Coughlin, Chairman of the Sewer Committee, and Mr. W. E. Natanson, City Engineer, and Mr. Timmons, a resident of the Thyneville sewer district, on April 30, 1912.

It appears from this inspection that the proposed sewer is to follow the axis of a comparatively narrow valley through a sparsely settled district. Most of the streets in this section are only paper streets and have not been laid out on the ground as yet. It was, therefore, impossible to determine with any degree of accuracy the location of the proposed streets, but it was evident from the inspection that the topographical map of the city which had been used in connection with the examination of the plans is not correct with respect to all portions of the proposed sewer district, inasmuch as it shows the axis of the valley in general along South and Seventh avenues.

It was impossible to determine from the necessarily brief field inspection and without an instrumental survey if it would be practicable to follow at least some of the proposed streets for a portion of the distance between Perry and Genesee streets. It appeared, however, that such a route would probably not be as direct as the one shown by the plans and that the proposed aligment is, therefore, in all probability as economical as any.

From our careful examination of the plans it is found, however, that although the proposed sewer which is to be 20 inches in diameter for its entire length, with a minimum slope of 0.34 per cent., has been carefully designed with respect to alignment, slopes, grades, facilities for cleaning and inspection and other features of an hydraulic and sanitary nature so that no difficulty should be experienced from clogging of the proposed sewer, provided it is properly constructed, it appears that with the slopes provided for in the design the proposed sewer is somewhat over designed as to capacity and could probably be reduced in size with safety for its entire length. This seems to be true, especially with reference to the upper section of the sewer, which could in all probability be reduced to 10 or 12 inches in diameter, provided that in the construction it be made sufficiently watertight to prevent excessive infiltration of ground water and assuming that the area shown by the plans tributary to the proposed sewer be not materially extended.

With reference to means for properly treating the sewage from the Thyneville sewer district as well as from other portions of the city before its discharge into Cayadutta creek, it may be well to review the steps heretofore taken by this Department in this matter. On June 15, 1910, plans for an intercepting sewer in the city of Johnstown along Cayadutta creek were approved by this Department and one of the conditions of the permits issued in connection therewith and in connection with plans for an extension to the intercepting sewer and for sewer extensions in the city approved on later dates required "that on or before June 1, 1911, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city shall be submitted for approval."

This requirement of the above named permits was not met and the matter has been repeatedly taken up with the city authorities. On February 5, 1912, a resolution was adopted by the common council of the city of Johnstown advising several reasons why the city felt justified in asking for a postponement of two years of the time for submitting the plans for sewage purification.

In view of the fact that the work of constructing the intercepting sewer had been undertaken by the city authorities of the city of Johnstown as a necessary part of the scheme of proper sewage disposal and since this work

has not yet been completed owing to unavoidable sonable to grant an extension of the time for s disposal for the city.

In view of the results of the examination of Department and in view of the foregoing discuss plans for sewage disposal, I beg to recommend th ville trunk sewer be approved and that a permit charge of sewage into Cayadutta creek, which pe tion to the usual revocation and modification cl or before March 1, 1913, complete detailed plans ment for the purification of the entire sanitary town shall be submitted for approval.

This would constitute an extension of the tim disposal for the city and I would suggest that tl that the requirements must be met within the t further extensions can be granted.

Respectfu

PERMIT

Application having been duly made to the S as provided by section 77 of chapter 49 of th Health Law," as amended by chapter 553 of tl chapter 45 of the Consolidated Laws, permissio mon council of the city of Johnstown to disch ville trunk sewer into the waters of Cayadutta the plans within the town of Johnstown, in acc panying the petition, under the following condi

1. That this permit shall be revocable at fication or change when in the judgment Health such revocation, modification or ch
2. That the issuance of this permit sha any way action by this Department on an be made for permission to discharge add the waters of this State.
3. That only sanitary or domestic sewa face water from streets, roofs or other s proposed sewers.
4. That on or before March 1, 1913, factory to this Department for the puri sewage of the city of Johnstown shall be

Acting S

May 15, 1912

EUGENE H. PORTER, M.D., *State Commissione*

DEAR SIR: — I beg to submit the followin plans for a proposed sewer extension in the this Department for approval.

These plans were first presented on May 20 has been withheld pending the compliance by by this Department in connection with the ap sions of the city under date of June 15, 19 required "that on or before June 1, 1911, factory to this Department for the purificati of the city shall be submitted for approval."

An extension of the time specified by these permits for the submission of such plans was embodied in the permits granted to the city authorities on May 15, 1912, and the approval of the present plans may, therefore, be properly considered at this time.

The plans now under consideration show that it is proposed to construct a sewer some 140 feet long in Prospect street tributary to the Cayadutta creek, intercepting an outfall sewer which is now under construction under plans approved by this Department and which is to temporarily discharge into Cayadutta creek, about 700 feet south of Montgomery street.

The proposed sewer which is to be 8 inches in diameter is to be constructed with a slope of 0.5 per cent. and should be adequate as to size and capacity to care for the sanitary sewage of the section to be served by it, inasmuch as this sewer will probably never be extended.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge through the temporary outlet into Cayadutta creek and that the permit contain in addition to the usual revocation and modification clauses the condition that on or before March 1, 1913, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city of Johnstown shall be submitted for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Johnstown to discharge sewage from the proposed sewer extension in Prospect street, into the waters of Cayadutta creek through existing sewer outlet, within the municipality of Johnstown, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That on or before March 1, 1913, complete detailed plans satisfactory to this Department for the purification of the entire sanitary sewage of the city of Johnstown shall be submitted for approval.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

May 28, 1912

KEUKA PARK (Keuka College)

Plans for a proposed sewage disposal plant consisting of a settling tank of the Imhoff type and a subsurface irrigation system to treat the sewage of the Keuka College at Keuka Park were approved on August 9, 1912, on condition that the length of the subsurface tiling be increased approximately 50 per cent. over that shown by the plans. No permit was issued in con-

and efficiency of the sewage disposal plant as a whole and of the capacities and practical operation of the individual structures, appurtenances and apparatus.

The plans show that the proposed sewers are to vary in size from 6 to 15 inches in diameter and that they are to cover all developed portions of the village. The alignments of the sewers are to be straight between manholes which are to be placed at all points of change of slope or alignment, and flush tanks are to be located at the upper ends of a number of lateral sewers where the slopes are comparatively flat. The plans also show that it is proposed to install lampholes at intermediate points between adjacent manholes on certain long lines of sewers, where there is no change of slope or alignment, and also at the ends of a number of lateral sewers, although lampholes may be permitted under the first mentioned conditions; manholes, however, should be substituted for the proposed lampholes at the ends of all sewers except on very short sections in order to facilitate cleaning and inspection.

It is proposed to carry the sewage under the Erie canal at two points, and the small stream tributary to Johnson creek is to be crossed at three points. The sewers are to be carried under the canal and stream on straight slopes at all of these crossings except at Francis street, where it is proposed to use an inverted siphon, consisting of 8-inch cast-iron pipe 52 feet long.

It would appear that more satisfactory results would be obtained, and there would be less liability of clogging, if 2 pipes of smaller diameter, say 6-inch pipes, were substituted for the single 8-inch pipe. These pipes should be so arranged that one of them may be operated at a time especially during the early life of the system, when the contribution of sewage will probably be comparatively small at this point.

It is proposed to treat the sewage collected by the sewer system in a sewage disposal plant to be located in the town of Hartland near the branch of Johnson creek in the northwesterly portion of the village. This stream, which flows through the western portion of the village in a northerly direction, has a drainage area at this point of some 10 or 12 square miles, consisting mostly of a rather flat territory having a fairly large rural population. It passes under the Erie canal within the village limits and its flow, according to the reports of the engineer, is augmented considerably by overflow from the canal and from leakage of the draw-off gates. This stream is a tributary of Johnson creek, which empties into Lake Ontario some eighteen miles northeast of the village, and the records of the Department do not show that either of these streams are used as a source of public water supply below the proposed location of the sewage disposal plant.

Although the proposed site for the disposal plant appears to be favorably located with reference to the village as a whole, it is shown by the plans to be situated rather close to the residences along the highway leading north from the village. One house is located about 75 feet from the plant and another within 150 feet of it. The plant should be located if possible at a point more remote from nearby houses where it would be less liable to create a nuisance.

The sewage disposal plant for the village is to consist of a cylindrical settling tank of the Imhoff or Emscher type, a sprinkling filter and an auxiliary sludge bed for the disposal of sludge.

The sewage upon reaching the disposal plant is to discharge through a 12-inch cast-iron pipe into a steel trough fastened on the outside of the reinforced concrete cylinder which separates the sludge chamber from the settling compartment. This trough extends above the flow line of the tank and is provided with holes located below the flow line which will tend to give the sewage a uniform downward flow as it enters the settling compartment. A steel cylinder about 10½ feet in diameter and about 9 feet long extending above the flow line in the tank is to be placed in the settling compartment in order to reverse the flow of the sewage and give it first a downward and then an upward flow.

The settling compartment of the tank has sufficient capacity to give about 2 hours' average detention of sewage when serving the present population assuming a per capita rate of sewage contribution of 100 gallons per day.

KINGS PARK (State Hospital)

Plans for alterations and additions to the sewerage system and sewage disposal works at Kings Park State Hospital were approved on June 28, 1912, and a copy of the approved plans transmitted to the State Architect.

ALBANY, N. Y., *June* 27, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.*:

DEAR SIR: — I beg to submit the following report on an examination of plans for alterations in and addition to the sewerage system and sewage disposal works at Kings Park State Hospital. These plans were submitted on June 21 by Hon. Herman W. Hoefer, State Architect, under the provisions of section 14 of the Public Health Law, plans having been prepared by Rudolph Herring and George W. Fuller at the direction of the State Architect.

Plans for sewerage and sewage disposal at the Kings Park State Hospital were approved by this Department on December 29, 1908. These plans provided for a separate system of sewerage and the necessary connections with the plumbing of the institution to divert sanitary sewage from the existing combined sewers. The plans also provided for a system of sewage disposal works consisting of settling tanks of the Dortmund type, sprinkling filters, sludge trenches for disposing of the sludge collected from the settling tanks, and a final settling basin for the effluent from the sprinkling filters. The plant was installed and has been in operation some three years.

The proposed additions to and alterations in the plant consist in the conversion of the Dortmund type settling tanks to settling tanks of the Imhoff type by removing and changing certain weirs and inlet, outlet and sludge pipes by means of which the tanks have been operated as Dortmund tanks, and inserting inner partitions in the tanks, together with the necessary change in inlet and outlet weirs and sludge pipe arrangements to provide for the proper operation of the tanks as Imhoff tanks. The sludge trenches as shown by plans now under consideration are to be used to dispose of sludge from the final settling tank, and new open sludge drying beds are to be constructed in connection with the operation of the tanks as Imhoff tanks.

Minor changes proposed by the plans include a new 8-inch sewer from the isolation cottage connecting with the main trunk and a duplicate inverted siphon crossing the watercourse near the boiler house of the institution. The original plans proposed that this inverted siphon of 8-inch pipe should be in duplicate, but it is explained that limited appropriations prohibited the construction of the second siphon pipe when the plant was installed.

An examination of the plans presented shows that the combined settling compartment capacity of the two tanks will be 37,000 gallons, giving an average detention of about 1¾ hours for sewage contributed by 5,000 people at the rate of 100 gallons per capita per day. The sludge digesting or total storage capacity of the two tanks amounts to about 54 per cent. of the total capacity of the tanks.

It is proposed to construct a sludge drying bed to receive the sludge from the Imhoff tanks. This bed will have an area of about 2,600 square feet and will be composed of broken stone graded in size with a total depth of 12 inches. The lower 5 inches will be composed of stone from 1 inch to 2½ inches in its greatest dimension; the next 5 inches of ¼ inch to ¾ inch stone; and the top 2 inches of 1/16 inch to ¼ inch screenings, and over the surface of the bed will be spread a layer of coarse mortar sand ¼ inch in depth.

The addition to the area of the sprinkling filter which is now proposed was shown by dotted lines on the original plans. The sprinkling filter as now constructed has an area of about ⅙ of an acre, while the proposed total area of the bed after the additional work has been added will be about ¼ of an acre, giving a rate of operation, on a basis of 100 gallons of sewage per capita per day from 5,000 persons, of 2,000,000 gallons per acre per day.

The sprinkler filter system nozzles are spaced 13 feet on centers and are

to be of the Taylor square distributor type. The bed is composed of 7 feet of broken stone 1 inch to 2½ inches in greatest dimension.

The changes proposed by the plans were made necessary principally by the local conditions being unfavorable to the proper disposal of sludge from tanks of the Dortmund type and by the desirability of increasing the sprinkling filter area to the full area shown by the original plans for the final size of the filter.

Our careful examination of these plans indicates that these alterations and additions have been designed with careful attention to essential requirements such as to method of treatment, capacity and facility of convenient operation; and it is my opinion that if the work of construction is carried out in accordance with these plans, and the plant is operated efficiently, a sanitary disposal of the sewage of the institution will be effected.

I beg to recommend, therefore, that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

LARCHMONT

On April 4, 1912, the following permit was granted to the board of trustees of the village of Larchmont.

In the Matter of the application for an extension of the time for submitting plans for sewage disposal for the village of Larchmont as required by the State Commissioner of Health in a permit for sewage discharge into Larchmont harbor issued under section 77 of the Public Health Law and dated June 13, 1911.

In response to a written application dated April 2, 1912, made on behalf of the board of trustees of the village of Larchmont by Mr. Clarence DeWitt Rogers, attorney for the village of Larchmont, and it appearing that said board has arranged for the preparation of plans for intercepting sewers and sewage disposal works for the village of Larchmont, but has found it difficult to have said plans completed before April 1, 1912, and being assured that said plans are in course of preparation, an extension of the time for filing said plans for intercepting sewers and sewage disposal works from April 1, 1912, to February 1, 1913, is hereby granted on this 4th day of April, 1912.

EUGENE H. PORTER,
State Commissioner of Health

This extension of the time for filing the plans for intercepting sewers and sewage disposal works for the village of Larchmont, constituting an amendment to the permit for sewage discharge granted June 13, 1911, to become operative must first be recorded in the county clerk's office of Westchester county.

LESTERSHIRE

Plan for the modification in the Lestershire sewer system and for sewer extensions in the Downsville sewer district of the city of Binghamton tributary to the Lestershire system were submitted for approval jointly by the board of trustees of the village of Lestershire and by the common council of the city of Binghamton on January 9, 1912. The plans were approved on January 17, 1912, and conditional permits were granted to the village and city authorities allowing the discharge, into the Susquehanna river, of sewage from the proposed sewers. For permits and report on the examination of the plans see Binghamton, page 426 of this report.

It is proposed to treat the sewage from the hospital in a sewage disposal plant, consisting of a settling tank and subsurface irrigation system, to be located several hundred feet from the main buildings. The sewage upon reaching the plant will be discharged through a 6-inch tile pipe into a small gate chamber from which the flow may be diverted into either or both compartments of the proposed settling tank through submerged inlets.

The tank is to be rectangular in plan and is divided into two equal compartments each of which has an average length of 13½ feet and a width of 3½ feet inside measurements with a depth of liquid of 5 feet near the inlet end and 4½ feet near the outlet end. The total capacity of each compartment when clean is about 1,650 gallons or equal to the flow of 8 hours based on an estimated contribution of sewage of 5,000 gallons per day. Both compartments will therefore care for a population of 100 persons on the same basis of design.

The settling tank is to be covered with a wooden roof which is to contain trap doors or manholes in order to facilitate inspection and cleaning. Wooden baffles are to be placed near the inlet and outlet ends of each compartment for the purpose of giving a uniform flow through the tank and also to prevent scum from reaching the outlet.

The clarified effluent from the settling tank is to flow over a weir extending across the outlet end of the tank into the adjacent dosing chamber, which has a capacity of about 76½ cubic feet and is to be provided with a 5-inch automatic discharge siphon by means of which the sewage is to be discharged through a 6-inch pipe into a gate chamber at the head of the subsurface irrigation field.

This field is divided into two portions so arranged that each portion may be operated on alternate days or alternate weeks. The distributing system is to consist of two main distributing pipes of 6-inch vitrified tile and lines of 3-inch laterals spaced 6 feet apart on centers. The total length of tiling in the lateral system will be 3,000 feet or about 60 lineal feet per person for the immediate future. The tile is to be laid with open joints at a depth of about 10 inches below the surface of the ground. Each dose from the siphon chamber will be sufficient to fill about one-half of the total subsurface irrigation system.

From our careful examination of the plans it is found that the proposed sewage disposal plant if properly constructed and if operated with care and efficiency should satisfactorily care for the sanitary sewage of the hospital and I would therefore recommend that the plans be approved. It should not be necessary to issue a permit in connection with the present plans inasmuch as no discharge of sewage or sewage effluent into any stream or watercourse is contemplated by them.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

MT. KISCO

Plans for proposed alterations in the intercepting sewers forming part of the sewer system of the village of Mt. Kisco were approved by this Department on July 25, 1912. On October 7, 1912, after a public hearing in the matter of an application of the board of trustees for the approval of the proposition to complete the village sewer system, the proposition to complete such system was approved. The report on the examination of the plans, the decision in the matter of the hearing and the permit issued under section 21 of the Public Health Law follow.

ALBANY, N. Y., *July* 25, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report as follows on an examination of plans for proposed alterations in the intercepting sewers forming a part of the sewer system of the village of Mt. Kisco for which plans were approved by this

about thirteen miles from the station. This house and one now nearing completion are the only ones upon the lake shores, all of which are owned by Mr. Litchfield. The water supply is obtained from springs, the lake water not being used for any domestic purpose.

The engineers estimated that the quantity of sewage for which provision should be made will vary from 300 gallons to 1,500 gallons per day, with an average of about 600 gallons per day.

In consideration of the fact that the number of occupants will vary from six to a possible twenty, and of the complete plumbing equipment of the house, the above estimation appears reasonable for a residence of this kind. The use of settling or septic tanks is considered impracticable, because of the great variation in sewage discharge.

The sewage from the house is to be conveyed to the disposal plant by means of a 5-inch vitrified tile sewer, and although the slope of the sewer is not shown, it appears from the plans and report to have a minimum grade of about 2 per cent. It is proposed to treat the sewage by means of sand filtration. It is received in a screening chamber provided with an inclined permanent bar screen and a ¾-inch diamond mesh screen of heavy galvanized wire to remove the material escaping the bar screen. A siphon set in a separate chamber discharges the sewage through a gate chamber on to the beds. By means of this gate one bed can be discontinued. The area of each bed is to be 300 square feet, total area 600 feet, which for a drainage of 600 gallons per day gives a rate of 43,560 gallons per acre per day. A series of lateral underdrains not shown on the plans convey the sewage into a 4-inch main drain and vitrified pipe discharge outfall. The final discharge is into a stream, flowing into the lake. The outer walls are to be of masonry and the dividing wall of concrete.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design and of local and general requirements with respect to proper methods for the disposal of sewage from this residence, it appears that the effluent from the plant, if properly constructed and operated, may be safely discharged into Madeleine lake.

I beg to recommend, therefore, that these plans be approved, and further that a permit be granted for the discharge of the effluent from the proposed disposal plant into a small stream following into Madeleine lake.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Edward H. Litchfield, Esq., to discharge effluent from the sewage disposal plant to treat the sewage from his residence on Lake Madeleine, near Tupper Lake Station, into the waters of a small tributary of Lake Madeleine, as shown by plans within the town of Altamont, Franklin county, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewers and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

two hours of low tide when the outlet valve would be closed and the effluent stored for eight hours until the next high tide.

The plans now under consideration were submitted in compliance with the requirements of a permit granted to the Long Beach Estates in connection with the approval of the original plans and provide for a sterilization plant, consisting of a mixing tank, a solution tank and automatic control valve for regulating the amount of chemical solution to be applied to the sewage.

According to the report of the designing engineer it is proposed to use about 100 parts of hypochlorite per million for the purpose of disinfecting the settled or clarified sewage. This would amount to about 835 pounds of hypochlorite per million gallons of effluent treated and would appear to be considerable more than necessary. From our present knowledge of the action of hypochlorite on sewage and in view of the length of time available for reaction of the chemical on the effluent in the storage tank it would seem that from 200 to 250 pounds of hypochlorite per million gallons of sewage effluent treated should be a safe allowance in the present case.

The solution of hypochlorite is to be applied to the effluent through a spraying ring placed inside and near the upper end of a 12-inch effluent pipe, between the last compartment of the settling tank and the storage chamber. The pipe is to be provided with baffles to facilitate mixing the chemical with the effluent. The amount of solution to be applied is to be regulated by means of a valve on the feed pipe from the solution tank, which is to be controlled by a float, located in the vertical section of a 12-inch pipe connected with the settling tank. By this means the amount of solution applied to the effluent will tend to vary with the level of the sewage in the settling tank, which in turn will vary with the rate of flow of sewage.

From our careful examination of the plans it would appear that the proposed hypochlorite plant if properly constructed and if operated with care and efficiency in connection with the settling and storage tank should produce an effluent that may be safely discharged into Broad or Long Beach channel at the present time. I am of the opinion that not less than 200 pounds of hypochlorite per million gallons of sewage treated should be used and that the amount of hypochlorite to be used should be determined upon by experiment after the plant is put in operation.

In view of the above I would recommend that the plans be approved. It should not be necessary, however, to issue a permit in connection with the approval of these plans, inasmuch as they were submitted in compliance with the requirements of the permit granted to the Long Beach Estates on March 16, 1910, and since this permit stipulates under what conditions the disposal plant shall be constructed and operated.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

MADELEINE LAKE (E. H. Litchfield)

Plans for sewage disposal for the residence of Edward H. Litchfield on Madeleine lake, in Franklin county, were approved on July 17, 1912, and a permit was issued to Mr. Litchfield allowing the discharge into a tributary of Madeleine lake of effluent, from the proposed sewage disposal plant, consisting of a screen and dosing chamber and intermittent sand filters. The report on the examination of the plans and the permit are given below.

ALBANY, N. Y., *July* 12, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewage disposal at the residence of Edward H. Litchfield, Esq., situated on Lake Madeleine, near Tupper Lake Station.

The plans were prepared by Waring, Chapman & Farquhar, civil engineers of New York city, and according to their report the residence is located

about thirteen miles from the station. This house and one now nearing completion are the only ones upon the lake shores, all of which are owned by Mr. Litchfield. The water supply is obtained from springs, the lake water not being used for any domestic purpose.

The engineers estimated that the quantity of sewage for which provision should be made will vary from 300 gallons to 1,500 gallons per day, with an average of about 600 gallons per day.

In consideration of the fact that the number of occupants will vary from six to a possible twenty, and of the complete plumbing equipment of the house, the above estimation appears reasonable for a residence of this kind. The use of settling or septic tanks is considered impracticable, because of the great variation in sewage discharge.

The sewage from the house is to be conveyed to the disposal plant by means of a 5-inch vitrified tile sewer, and although the slope of the sewer is not shown, it appears from the plans and report to have a minimum grade of about 2 per cent. It is proposed to treat the sewage by means of sand filtration. It is received in a screening chamber provided with an inclined permanent bar screen and a ¾-inch diamond mesh screen of heavy galvanized wire to remove the material escaping the bar screen. A siphon set in a separate chamber discharges the sewage through a gate chamber on to the beds. By means of this gate one bed can be discontinued. The area of each bed is to be 300 square feet, total area 600 feet, which for a drainage of 600 gallons per day gives a rate of 43,560 gallons per acre per day. A series of lateral underdrains not shown on the plans convey the sewage into a 4-inch main drain and vitrified pipe discharge outfall. The final discharge is into a stream, flowing into the lake. The outer walls are to be of masonry and the dividing wall of concrete.

In view of the results of our examination of these plans and after careful consideration of the essential features of the design and of local and general requirements with respect to proper methods for the disposal of sewage from this residence, it appears that the effluent from the plant, if properly constructed and operated, may be safely discharged into Madeleine lake.

I beg to recommend, therefore, that these plans be approved, and further that a permit be granted for the discharge of the effluent from the proposed disposal plant into a small stream following into Madeleine lake.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to Edward H. Litchfield, Esq., to discharge effluent from the sewage disposal plant to treat the sewage from his residence on Lake Madeleine, near Tupper Lake Station, into the waters of a small tributary of Lake Madeleine, as shown by plans within the town of Altamont, Franklin county, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewers and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water or surface water from grounds, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into Lake Madeleine or any other water course.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

July 17, 1912

MAMARONECK

On May 25, 1912, application was made by the board of trustees of the village of Mamaroneck for the approval of plans for a proposed sewer in Boston Post road. The plans were approved on June 6, 1912, and a permit was issued to the village authorities on the same date allowing the discharge into Mamaroneck bay of sewage from the proposed sewer on condition that detailed plans for preliminary treatment and general plans for more complete treatment of the entire sanitary sewage of the village shall be submitted for approval on or before October 1, 1912. The permit and the report on the examination of plans follow.

ALBANY, N. Y., *June* 4, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR:— I beg to submit the following report on an examination of plans showing amendments to the plans for sewerage for the village of Mamaroneck, Westchester county, submitted to this Department for approval on May 25, 1912.

It appears from the records of this Department that plans for a sewer system for the village of Mamaroneck and for a sewage disposal plant consisting of a screen chamber, storage tanks and tidal gates were approved by the then State Board of Health on December 21, 1900, the Board reserving the right to at any time require the proper purification of the sewage before final discharge of the same into the harbor of the village of Mamaroneck, as contemplated by the plans. These outlet works were to serve the entire system and were to be located at the foot of Oakhurst avenue.

On February 5, 1902, plans were approved which provided for the location of similar outlet works on Harbor Island and an outlet sewer from the foot of High street running thence southwesterly to the foot of Mamaroneck avenue and thence under or near the causeway and across Harbor Island to the outlet works, with the point of discharge in the main channel in the vicinity of Harbor Island dock, thus deferring the construction of the Orienta Point and Oakhurst portions of the sewer system. Since then no further plans have been presented for the approval of the Department until the plans now under consideration were submitted and it appears that the outlet works have not been constructed.

The original plans provided for a sewer running westerly in that portion of the Boston Post road from a point some 500 feet west of School street to a point about 200 feet east of the westerly village line and thence southerly and westerly through private property for a distance of about ½ mile to Union avenue opposite Meadow avenue.

The plans now before the Department show that it is proposed to abandon the route through private property and to construct an 8 and 10-inch sewer in Boston Post road from the westerly village line easterly to connect with the existing sewer in this street at Rockland avenue. Between Rockland and Union avenues the existing sewer in the Post road is to be reconstructed and changed from 8 inches to 10 inches in diameter.

The proposed modification will require considerable deep cutting through the crest of the hill on the Boston Post road west of School street and the proposed sewer will parallel the existing 8-inch sewer in this road for a distance of some 1,000 feet. It is estimated by the village engineer, however, that it will ultimately be cheaper to carry out the present plans than to

convey the sewage from the Boston Post road through a long outlet sewer through private property according to the original plans of 1900, considering the necessity of securing easements for right of way through such property. It appears, moreover, that the specific reason for constructing the proposed sewer at this time is in order to permit of repaving the Boston Post road at an early date, and the necessity for securing rights of way through private property would in all probability delay the sewer construction and consequently the paving of the Post road, which delay the village is desirous of avoiding.

From our careful examination of the plans it is found that the proposed sewer is to be constructed with slopes sufficiently steep to produce self-cleansing velocities under ordinary conditions and if properly constructed should be adequate as to size and capacity to satisfactorily care for the sanitary sewage of the section to be served by it.

It should be noted in this connection that the proposed sewer construction will result in an increase in the amount of untreated sewage discharged into Mamaroneck Harbor and Long Island sound, and it is therefore not consistent with the approved plans for sewerage for the village which provided for a partial treatment of the sewage before its discharge into the harbor. Most of the municipalities situated along the shores of Long Island sound, moreover, have either constructed or are contemplating the construction of sewage disposal plants under plans approved by the Department either for the protection of the oyster beds located in the sound or for the purpose of preventing the creation of a nuisance along the shores so that in the the near future the entire sanitary sewage of this section of the State will be treated before it is discharged into Long Island sound or its tributaries.

I am of the opinion that in view of the foregoing and of the rapid development that is taking place along the north shore of Long Island sound, definite steps should be taken in the immediate future to provide for at least clarification or partial purification of the entire sanitary sewage of the village before it is discharged into the harbor not only for the protection of the village itself but also for the protection of adjacent municipalities.

I would therefore recommend that approval of the plans for the proposed sewer in the Boston Post road be given on the condition that on or before October 1, 1912, detailed plans for preliminary treatment works and general plans showing type and location of more complete works to care for the entire sanitary sewage of the village be submitted to this Department for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Mamaroneck to discharge sewage from the proposed sewer extensions in Boston Post road into the waters of Mamaroneck harbor through an existing outlet sewer within the municipality of Mamaroneck in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

4. That on or before October 1, 1912, satisfactory detailed plans for a clarification by sedimentation of the entire sanitary sewage of the village of Mamaroneck, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage, shall be submitted to this Department for approval; and that upon approval of said plans such clarification works shall be constructed and put in operation on or before November 1, 1913.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

June 6, 1912

MIDDLEPORT

On December 8, 1911, application was made by the board of trustees of the village of Middleport for the approval of plans for sewerage and sewage disposal. The plans were returned to the village for revision on December 28, 1911, and, after being amended in accordance with the recommendations of this Department, they were resubmitted for approval on January 10, 1912. The amended plans were approved on January 17, and two permits were issued to the village authorities allowing the discharge into Johnson creek, of effluent from two proposed sewage disposal plants to be constructed in connection with the projected sewer systems. The permits and reports on the examination of the plans are given below.

ALBANY, N. Y., *December* 26, 1911.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewerage and sewage disposal for the village of Middleport, Niagara county, submitted to this Department for approval by the board of trustees on December 8, 1911.

The plans were prepared by Charles C. Hopkins, consulting engineer of Rochester, and comprise duplicate copies of report and specifications, together with the following plans also in duplicate:

(1) Contour map of the village showing location of the sewers.
(2) Profiles of streets and proposed sewers.
(3) One sheet showing details of appurtenances.
(4) Two sheets showing sewage disposal works.

The village of Middleport is situated in the extreme northeastern portion of the town of Royalton, on the Niagara division of the New York Central and Hudson River railroad, the Erie canal and on a branch of Johnson creek. The Erie canal runs through the central portion of the village from east to west and crosses the creek which flows through the western section of Middleport in a northerly direction. The village, at present, is not provided with a public water supply, but, according to the report of the designing engineer, plans for a proposed public water supply to be derived from wells located southwest of the village are being prepared.

The present population of the village of Middleport, according to the census of 1910, is approximately 1,530, and the area of the village is about 600 acres, giving an average density of about 3 persons per acre. The increase of the population of the village has been rather slow during the past decade, but, based on an assumed density of population of 10 persons per acre, it is estimated that the population which will ultimately contribute sewage to the proposed water system will be approximately 6,000.

The plans have been carefully examined with respect to the sewer system and sewage disposal works. In connection with the sewer system, the design has been carefully studied with reference to alignments, sizes, grades, capacities, facilities for cleaning and inspection and flushing and other features of a hydraulic and sanitary nature. In connection with means for sewage disposal, it has been studied with reference to general method

and efficiency of the sewage disposal plant as a whole and of the capacities and practical operation of the individual structures, appurtenances and apparatus.

The plans show that the proposed sewers are to vary in size from 6 to 15 inches in diameter and that they are to cover all developed portions of the village. The alignments of the sewers are to be straight between manholes which are to be placed at all points of change of slope or alignment, and flush tanks are to be located at the upper ends of a number of lateral sewers where the slopes are comparatively flat. The plans also show that it is proposed to install lampholes at intermediate points between adjacent manholes on certain long lines of sewers, where there is no change of slope or alignment, and also at the ends of a number of lateral sewers, although lampholes may be permitted under the first mentioned conditions; manholes, however, should be substituted for the proposed lampholes at the ends of all sewers except on very short sections in order to facilitate cleaning and inspection.

It is proposed to carry the sewage under the Erie canal at two points, and the small stream tributary to Johnson creek is to be crossed at three points. The sewers are to be carried under the canal and stream on straight slopes at all of these crossings except at Francis street, where it is proposed to use an inverted siphon, consisting of 8-inch cast-iron pipe 52 feet long.

It would appear that more satisfactory results would be obtained, and there would be less liability of clogging, if 2 pipes of smaller diameter, say 6-inch pipes, were substituted for the single 8-inch pipe. These pipes should be so arranged that one of them may be operated at a time especially during the early life of the system, when the contribution of sewage will probably be comparatively small at this point.

It is proposed to treat the sewage collected by the sewer system in a sewage disposal plant to be located in the town of Hartland near the branch of Johnson creek in the northwesterly portion of the village. This stream, which flows through the western portion of the village in a northerly direction, has a drainage area at this point of some 10 or 12 square miles, consisting mostly of a rather flat territory having a fairly large rural population. It passes under the Erie canal within the village limits and its flow, according to the reports of the engineer, is augmented considerably by overflow from the canal and from leakage of the draw-off gates. This stream is a tributary of Johnson creek, which empties into Lake Ontario some eighteen miles northeast of the village, and the records of the Department do not show that either of these streams are used as a source of public water supply below the proposed location of the sewage disposal plant.

Although the proposed site for the disposal plant appears to be favorably located with reference to the village as a whole, it is shown by the plans to be situated rather close to the residences along the highway leading north from the village. One house is located about 75 feet from the plant and another within 150 feet of it. The plant should be located if possible at a point more remote from nearby houses where it would be less liable to create a nuisance.

The sewage disposal plant for the village is to consist of a cylindrical settling tank of the Imhoff or Emscher type, a sprinkling filter and an auxiliary sludge bed for the disposal of sludge.

The sewage upon reaching the disposal plant is to discharge through a 12-inch cast-iron pipe into a steel trough fastened on the outside of the reinforced concrete cylinder which separates the sludge chamber from the settling compartment. This trough extends above the flow line of the tank and is provided with holes located below the flow line which will tend to give the sewage a uniform downward flow as it enters the settling compartment. A steel cylinder about 10½ feet in diameter and about 9 feet long extending above the flow line in the tank is to be placed in the settling compartment in order to reverse the flow of the sewage and give it first a downward and then an upward flow.

The settling compartment of the tank has sufficient capacity to give about 2 hours' average detention of sewage when serving the present population assuming a per capita rate of sewage contribution of 100 gallons per day.

A longer period of detention of the sewage would be provided for and a higher efficiency would be obtained if the partition wall between the settling compartment and sludge compartment were removed and the tank be operated as an ordinary settling tank. Such a tank, moreover, would lend itself more readily to extension or conversion into a pump well should it ever be required to extend this plant or to pump the sewage into the main sewer system. I am of the opinion that, in view of the small amount of sewage that will probably be tributary to this plant for a considerable period, the proposed settling tank, if modified in accordance with the above suggestions, should satisfactorily meet the requirements for sewage disposal for this section for the present.

The site of the disposal plant which is to serve the main portion of the village is to be located in the town of Hartland near the stream about 1,000 feet below the site shown by the plans as first submitted. This appears to be a more favorable location for sewage disposal works inasmuch as the nearest residence is more than 500 feet from the works according to the engineer's report. It is also to be located on the east side of the highway leading north from the village where it would be less liable to create a nuisance at the highway since the prevailing winds are from a westerly direction.

The dosing chamber to be constructed in connection with the sprinkling filter is to be hopper shaped, which, in connection with the sprinkling nozzles, will tend to give a more uniform distribution over the surface of the sprinkling filter. The filters are also provided with 6-inch underdrains spaced about 3 feet apart on centers, thus giving a better opportunity for aeration of the filters and for cleaning the underdrain system.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge into a tributary of Johnson creek of effluent from the proposed sewage disposal plants and that the permit contain in addition to the usual revocation and modification clauses the provision that the proposed sewage disposal plant in Sherman road be modified in accordance with the recommendations embodied in this report and that the sewage tributary thereto be pumped into the main sewer system whenever required by the State Commissioner of Health.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Middleport to discharge effluent from the sewage disposal plant to be constructed in connection with the proposed sewer system for the village into the waters of a tributary of Johnson creek about 1,300 feet north of the village within the town of Hartland, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge from any part of the disposal works shall be discharged into the tributary to Johnson creek or any other water course.

EUGENE H. PORTER,

January 17, 1912 *State Commissioner of Health*

3. The site for the disposal plant is not a pr should not be located at the point indicated unle no other site, at some considerable distances fr ways, is available.

4. That the dosing chamber be changed so as to form distribution of the sewage over the surface c

5. That the sprinkling filter be provided with drain system.

6. That a double tubed inverted siphon be sub pipe inverted siphon crossing under the creek at F

Respectfully submitted
THEOD

ALBANY, N. Y

EUGENE H. PORTER, M.D., *State Commissioner of Healt*

DEAR SIR: — I beg to submit the following report on vised plans for sewerage and sewage disposal *for the* resubmitted to this Department for approval on January

These plans were first submitted for approval by the the village on December 8, 1911, and after a *careful exa* the engineering division a report was submitted to you u ber 26, 1911, giving the results of this examination and tions for certain changes, amendments or *additions befo* ance of them. The plans were accordingly returned by y 1911, with recommendations that they be modified in the

1. That manholes be substituted for lampholes at th sewers except in the case of very short sections.

2. That provisions be made for treating *the sewag* proposed sewer in Sherman road, preferably by pumpin the general system.

3. The site for the disposal plant is not *a proper* should not be located at the point indicated unless it no other site, at some considerable distance from dv ways, is available.

4. That the dosing chamber be changed so as to provi form distribution of the sewage over the surface of the

5. That the sprinkling filter be provided *with a fals* drain system.

6. That a double tubed inverted siphon be substitut pipe inverted siphon crossing under the creek at *Francis*

The revised plans have been carefully examined and it is have been revised in general accordance with all *of the above* and that the capacity of the sludge decomposing chamber in t has also been increased by about 50 per cent. as was suggeste my former report.

Provisions have also been made for treating the sewage to the proposed sewer in Sherman road west of the creek in a disposal plant. The proposed sewer is about *800 feet long* a present two farmhouses located on this road, according to the report of the designing engineer, which are presumably to be this sewer.

It is proposed to treat the sewage from this section in a s the Imhoff type divided by a partition wall into two compartm the settling of the sewage and the other for *the storage and de* sludge. It appears, however, that assuming a tributary populat sons, the settling compartment, which has a capacity of about entirely too small to give satisfactory results *even for the imm* considering the usual large fluctuations of the flow of sewage a population, and it is doubtful if the ordinary basis used *in* Imhoff tanks would apply to very small *installations.*

A longer period of detention of the sewage would be provided for and a higher efficiency would be obtained if the partition wall between the settling compartment and sludge compartment were removed and the tank be operated as an ordinary settling tank. Such a tank, moreover, would lend itself more readily to extension or conversion into a pump well should it ever be required to extend this plant or to pump the sewage into the main sewer system. I am of the opinion that, in view of the small amount of sewage that will probably be tributary to this plant for a considerable period, the proposed settling tank, if modified in accordance with the above suggestions, should satisfactorily meet the requirements for sewage disposal for this section for the present.

The site of the disposal plant which is to serve the main portion of the village is to be located in the town of Hartland near the stream about 1,000 feet below the site shown by the plans as first submitted. This appears to be a more favorable location for sewage disposal works inasmuch as the nearest residence is more than 500 feet from the works according to the engineer's report. It is also to be located on the east side of the highway leading north from the village where it would be less liable to create a nuisance at the highway since the prevailing winds are from a westerly direction.

The dosing chamber to be constructed in connection with the sprinkling filter is to be hopper shaped, which, in connection with the sprinkling nozzles, will tend to give a more uniform distribution over the surface of the sprinkling filter. The filters are also provided with 6-inch underdrains spaced about 3 feet apart on centers, thus giving a better opportunity for aeration of the filters and for cleaning the underdrain system.

In view of the above I would recommend that the plans be approved and a permit be issued allowing the discharge into a tributary of Johnson creek of effluent from the proposed sewage disposal plants and that the permit contain in addition to the usual revocation and modification clauses the provision that the proposed sewage disposal plant in Sherman road be modified in accordance with the recommendations embodied in this report and that the sewage tributary thereto be pumped into the main sewer system whenever required by the State Commissioner of Health.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Middleport to discharge effluent from the sewage disposal plant to be constructed in connection with the proposed sewer system for the village into the waters of a tributary of Johnson creek about 1,300 feet north of the village within the town of Hartland, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into the tributary to Johnson creek or any other water course.

EUGENE H. PORTER,
State Commissioner of Health

January 17, 1912

PERMIT

Application having been duly made to the St as provided by section 77 of chapter 49 of the Health Law," as amended by chapter 553 of th chapter 45 of the Consolidated Laws, permission of trustees of the village of Middleport to disch disposal plant to be constructed in connection wi for the village into the waters of a tributary road, within the municipality of Middleport, in companying the petition, under the following cc

1. That this permit shall be revocable at fication or change when in the judgment Health such revocation, modification or cl
2. That the issuance of this permit shall way action by this Department on any fu made for permission to discharge addition waters of this State.
3. That both the sewer system and the s plans approved this day shall be fully cons with such plans or approved amendments section VI.
4. That only sanitary or domestic sewa face water from streets, roofs or other proposed sewers.
5. That no sewage sludge from any part discharged into the tributary to Johnson
6. That the disposal plant in Sherman r ity of not less than 750 gallons and the properly increased when the number of the plant shall exceed 15.
7. That whenever required by the Stat tional works for more complete treatme tributary to said disposal plant shall be plans submitted to and approved by this be collected by the proposed sewers in tl the general sewer system and sewage dis

January 17, 1912

MONTGOMERY COUNTY TUBI

Plans for a sewage disposal plant consist surface irrigation system to treat the sewag losis Hospital were approved on September 1 in connection with the approval of these pl sewage or sewage effluent into any stream by them. The report on the examination o

ALB

EUGENE H. PORTER, M.D., *State Commissio*

DEAR SIR: — I beg to submit the follow plans for sewage disposal for the Montgom to be located in the town of Amsterdam at Amsterdam.

It appears from the general plans of tl accommodate about 50 persons, including present installation. Assuming a per cap 100 gallons per day the daily flow of se gallons.

Department October 24, 1907, the permit for the the sewage disposal plant to be constructed in con sewer system having been issued December 4, 1907

These plans were submitted on July 23, 1912, by letter asking for their approval was also receive Slosson, attorney for the village of Mt. Kisco. It ap construction the sewer system of the village of Mt cepted by the department of water supply, gas and city since such construction allowed excessive infil The arrangement between the city of New York and provided that the city authorities should construct and that the village should construct the sewer sy that the sewer system should be constructed so as to of the New York city authorities.

The plans before the Department propose changes respecting intercepting sewers, aiming to so reduce t tion in this sewer that the sewer system will be acc city authorities.

It is proposed to reconstruct the 18-inch intercept brook and to relay the 12-inch intercepting sewers al Main street and Lexington avenue. Some of the po tercepting sewers will be relayed with cast iron with

It is proposed to relay that portion of the 18-i along Branch brook from the pumping station to No above this point this sewer, it is stated, will not slope of the 18-inch intercepting sewer is to be red to be relayed from .2 per cent. to .11 per cent. This not reduce the carrying capacity below that necessar of the village tributary provided excessive infiltration not occur.

The sewage of the village collected by these and the general plans approved by this Department is tr disposal plant of the village of Mt. Kisco.

In view of the above I beg to recommend that the pla a permit has heretofore been issued for the discharg disposal plant it would appear that no permit would nection with the approval of these plans.

Respectfully submitt
THEODO

In the Matter of the application of the board of trustees Kisco, Westchester county, certifying for the approv missioner of Health a recommendation made by the b board of trustees of said village and approved by sa relative to the completion of the village sewer system plans prepared by George W. Fuller, Consulting Engin

EUGENE H. PORTER, M.D., *Commissioner, New York S Health, Albany, N. Y.:*

In the matter of the application of the board of trust Mt. Kisco certifying for my approval under section 21 o Law a recommendation certified to said board of truste health of the village of Mt. Kisco relative to the compl sewer system under plans prepared by George W. Fuller. and after careful consideration of the papers presented by ities or by other interested citizens and of the facts hearing in the matter held at this Department on appears:

This rate is several times higher than the usual rate at which filters of this type are operated and the proposed bed which contains only one unit would probably clog rapidly and require frequent cleaning even if the sewage was applied to the beds intermittently in regular doses.

In conclusion I would state that it appears from a careful examination of the plans that they do not show sufficient details to permit of a final examination of them and that they are not in satisfactory condition for approval. Details of the settling tank, dosing tank and siphon should be shown, together with a profile of the sewer and pipe connecting the different parts of the disposal plant. It is doubtful also that the proposed sprinkling filter which is to be located about 80 feet from the main building and from the highway could be operated without creating a nuisance. This filter might be covered with a small building provided with proper ventilators, or the filter might possibly be located at a greater distance from the main building. The area of the sand filter as noted above is too small and the bed should be divided into not less than two units so arranged that they may be operated alternately, thereby providing periods of rest.

In view of the above I would recommend that the plans be returned for amendment in accordance with the recommendations embodied in this report and that the designing engineer be advised that the plans when revised should be re-submitted in duplicate in order that if approved, one set of the approved plans may be returned to the institution and the other set retained in this office for filing.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *May* 11, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewage disposal for the Blythedale Home near Hawthorne, N. Y., in the town of Mt. Pleasant, Westchester county, which were resubmitted to this Department for approval on May 3, 1912.

These plans were first submitted for approval February 16, 1912, and after a careful examination of them by the engineering division a report was submitted to you under date of March 18, 1912, setting forth the results of this examination and making recommendations for certain modifications and additions before the final acceptance of them. The plans were accordingly returned to the designing engineer on March 20, 1912.

From our careful examination of the amended plans it is found that they have been revised in substantial accordance with the recommendations of the Department; the sizes of the pipes connecting the different structures have been increased and the different portions of the plant have been enlarged as recommended.

The separate structures of the disposal plant, consisting of settling tank, dosing chamber and siphon, sprinkling filter, final settling tank, dosing chamber and alternating siphons and intermittent sand filters, are to be located near the institution at distances varying from 40 to 200 feet from the main building.

The sewage from the institution building is to be conveyed through 54 feet of 6-inch pipe laid on a slope of 5.6 to a covered settling tank provided with submerged inlet and outlet. Manholes are also to be provided for the purpose of facilitating inspection and cleaning.

The settling tank which is to be 4 feet wide by 12 feet long is to vary in depth from 4 to 6 feet and will have sufficient capacity to give an average time of detention of about 8½ hours when serving the maximum population of 50 persons contributing sewage at the usually assumed rate of about 100 gallons per capita per day.

From the settling tank the effluent is to flow through a submerged outlet into an adjacent dosing chamber provided with 6-inch discharge siphon. This siphon is to discharge into the distributing system of a sprinkling filter 8 feet by 15 feet in plan. This filter, which is to be roofed over, is to be filled with

the discharge into Saw Mill river of effluent fr
posal plant consisting of a preliminary settling
settling tank and intermittent sand filters. Th
of the plans and the permit are given below.

ALB

EUGENE H. PORTER, M.D., *State Commissioner*

DEAR SIR: — I beg to submit the following rep
for sewage disposal for the Blythedale Home n
Mt. Pleasant, Westchester county, submitted to
on February 16, 1912.

The Blythedale Home, which according to th
neer, is an institution for crippled children, i
about one and one-half miles above Hawthorne
of from 40 to 50 persons, including inmates and
kers which is located about 12 miles below the
water supply from the Saw Mill river, filtratio

It is proposed to treat the sewage of the in
plant consisting of a settling tank, dosing tan
sand filter. It appears from the plans that the
siphon have already been installed and althoug
ities of these structures are shown on the plan
submitted and it is therefore impossible to exa
determine if they have been properly designed

It appears, however, from the data furnishe
tank is circular in plan and has a capacity of
this figure is correct, the tank has a capacity
tention of about 8 hours on the basis of a per
tion of 100 gallons per day. On the same
which has a capacity of about 400 gallons, w
to the sprinkling filter at intervals of about
25 feet of 3-inch pipe with a slope of about
tank and the filter. This pipe appears to be
increased in size to not less than 4 inches in
less than 6 inches in order to prevent cloggin

The sprinkling filter which is to be filled to
to 5 feet with one-half inch broken stone is
square feet and will be required to operate at
lons per acre per day. The effluent is to be a
through two fixed nozzles and is to be collect
drain after passing through the filtering mat

From the collecting drain of the sprinkling
the effluent through 172 feet of 2-inch pipe l
11.5 per cent. directly to a sand filter which
feet and a depth of sand of 5 feet. The cri
tween the siphon and the sprinkling filter a
between the two filter beds. A manhole shou
of alignment near the highway in order to f

The sprinking filter effluent is to be applie
bed through 4 nozzles, spaced about 6 feet
usual method of distribution for sand filters
form distribution of the effluent over the sur
distributing system of the sand filter is co
drains of the sprinkling filter. The solids
ters at irregular intervals would also tend t
of the sand filter unless they were allowed
sprinkling filter effluent through a short det
or sewage effluent should be applied to the s
tently by means of a dosing tank and altern

broken stone to a depth of from 4 feet 9 inches
be applied to the surface of the filter by means
it will be required to operate at the rate of abo
day on the basis of design used.

The effluent from the collecting drain of the
charged through a 6-inch pipe to the final settl
the preliminary settling tank. This final settl
average detention of sewage of about 3¾ hours w
tunity for the solid matter given off by filters o

From the final settling tank the clarified spri
into the dosing chamber in which is to be ins
siphons which under ordinary operating conditi
on to two intermittent sand filter beds for addi
ters which according to the plans are to be fille
of from 2 feet 6 inches to 3 feet 3 inches are
0.01 acres and will be required to operate at an
per acre per day. The effluent from the underd
be discharged into Saw Mill river. A portion
the city of Yonkers is derived from this stream,
below the proposed sewage disposal plant.

It appears, however, from a careful examinat
posed sewage disposal plant if properly constr
and efficiency should produce an effluent which
the Saw Mill river at the present time withou
fore recommend that the plans be approved an
the discharge of effluent from the proposed s
Saw Mill river.

Respectfully

PERMIT

Application having been duly made to the
as provided by section 76 of chapter 49 of th
Health Law," as amended by chapter 553 of
chapter 45 of the Consolidated Laws, permissi
tees of Blythedale Home to discharge effluent f
to be constructed at Blythedale Home in the tov
county, into the waters of Saw Mill river with
accordance with the plans accompanying the
conditions:

1. That this permit shall be revocable a
fication or change when in the judgment
Health such revocation, modification or c

2. That the issuance of this permit shal
way action by this Department on any f
made for permission to discharge additio
waters of this State.

3. That both the sewers and sewage dis
proved this day shall be fully constructe
such plans or approved amendments the
Condition (6).

4. That only sanitary or domestic sewa
face water from grounds, roofs or other
proposed sewers.

5. That no sewage sludge from any par
discharged into Saw Mill river or any ot

6. That whenever required by the Sta
sewage disposal works shall be modified
cordance with satisfactory plans approve

Acting S

May 15, 1912

From our careful examination of the plan
sewage disposal plant if properly constructe
efficiency should produce an effluent which ma
stream without objection at present, and I w
the plans be approved.

In view of the fact, however, that a public
Saw Mill river at a comparatively short dista
plant I would recommend that the permit c
revocation and modification clauses the con
by the State Commissioner of Health the p
enlarged, modified or extended and the efflu
before its discharge into the river, and t
installed at all points of change of alignment

Respectfully subm

PERMIT

Application having been duly made to the
as provided by section 76 of chapter 49 of
Health Law," as amended by chapter 553 of
chapter 45 of the Consolidated Laws, per
Fairview Country Club to discharge effluent
to be constructed on the grounds of said c
of Mt. Pleasant, Westchester county, into t
within the town of Mt. Pleasant, in accord
ing the petition, under the following condit

1. That this permit shall be revoca
modification or change when in the judg
of Health such revocation, modification

2. That the issuance of this permit
in any way action by this Department
may be made for permission to discha
into the waters of this State.

3. That both the sewers and sewage
approved this day shall be fully constru
such plans or approved amendments the

4. That only sanitary or domestic
surface water from the grounds, roofs
to the proposed sewers.

5. That no sewage sludge from any
be discharged into Saw Mill river or ar

6. That lampholes or manholes sha
change of alignment of the sewer.

7. That whenever required by the S
sewage disposal works shall be modified
ance with satisfactory plans approved

8. That whenever required by the S
effluent from the sewage disposal work
accordance with satisfactory plans app

Acting

May 15, 1912

Note.— This permit to become operativ
county clerk's office of Westchester county

From our careful examination of the plans sewer system and sewage disposal plant if prop with the plans and operated with care and care for the population for which it is design the disposal plant may safely be discharged creek at present without objection.

I would, therefore, recommend that the p

Respectfully subr

NEWARK

On April 9, 1912, application was made by village of Newark for the approval of am sewage disposal. The plans were approved o was issued to the village authorities allowin brook, of effluent from the proposed sewage screen and grit chamber, a preliminary sett sprinkling filter, final settling tank, sterilizat beds. On September 30 a permit was also allowing the temporary omission from constr permanent general sewer system of the villa the examination of the plans are given below.

A

EUGENE H. PORTER, M.D., *State Commissione*

DEAR SIR: — I beg to submit the followin revised plans for sewerage and sewage disp Wayne county, submitted to this Departmen board on April 3, 1912. Application signed b board acting as sewer commissioners asking was received on April 9, 1912.

Original plans for a comprehensive sewer works were approved by this Department on ber 5, 1911, plans showing amendment to th disposal for the village were approved. Th disposal plant consisting of septic tank, co located near the point where Murray street

According to the application of the muni District No. 2 approved on December 5, 1 detailed plans of the Mill street ejector s 50-gallon per minute ejectors by means of trict is to be discharged through a 4-inch gravity system of District No. 1 have been recommendations embodied in my former re plans for District No. 2 dated December 3,

The plans for Sewer District No. 1 show system in this district have been necessitat of the barge canal, and that it is proposed Colton avenue sewers and carry the entire of the village under the barge canal by mea eliminating one of the canal crossings show

The proposed inverted siphon is to cons pipe about 200 feet long and the head hous of lines in operation is automatically adju to the siphon. Facilities are also provide siphon.

municipal board of the village of Newark to discha
disposal plant to be constructed in connection wit
for the village into the waters of Military brook
the municipality of Newark, in accordance with
petition under the following conditions:

1. That this permit shall be revocable at a
fication or change when in the judgment of
Health such revocation, modification or chan

2. That the issuance of this permit shall n
way action by this Department on any f
be made for permission to discharge addition
waters of this State.

3. That both the sewer system and the s
by plans approved this day shall be fully
formity with such plans or approved amen

4. That only sanitary or domestic sewa
surface water from streets, roofs or other a
proposed sewers.

5. That no sewage sludge from any part
be discharged into Military brook or any o

EUGENE

Sta

April 17, 1912

To the Municipal Board, Water, Light and
Village of Newark, Wayne County, N. Y.

GENTLEMEN: — In response to the applicati
your board by Charles L. Kelley, village engin
1912, asking for my approval of the temporar
of certain portions of the permanent general se
Newark, plans for which were approved by th
1911, and amended plans for which were approv
certify my determination to approve and do ap
sion from construction, until the judgment
of Health or of the municipal board of the vi
may be necessary, of certain portions of said s

Four hundred and twenty-one feet of 8
West Maple avenue.

Five hundred and ninety-six feet of 8-inc

Nine hundred and ten feet of 8-inch se
street.

The above approval is duly given this 3
accordance with section 260, article 11 of
Laws, the Village Law.

Acting S

NEW HARTF(

On March 8, 1912, application was made
Sewer District No. 1 of the town of New Ha
for sewerage and sewage disposal. The plan
on March 26, 1912, and after revision were re
12. On March 25, 1912, application was a
trustees of the village of New Hartford askin

The sewers are to have straight alignments an
at nearly all points of change of slope or alignm
are to be installed at the upper ends of late
of keeping them clean during the early life of the
also be installed at the intersection of the existi
sewer in Capron near the property of the Sau
order to facilitate cleaning and inspection and
be found necessary to construct manholes at th
ment of the existing 6-inch sewer constructed in
The slope of the proposed sewer in the street bet
road and Kraemer place should also be marked o

From a careful examination of the plans it ap
has been designed with considerable care and
accordance with the above recommendations shou
system of sewerage. It is found that the prop
above, should be adequate as to sizes and capac
sewage of the estimated future population of the
vided that in the construction the sewers be ma
prevent excessive infiltration of ground water.

It is proposed to treat the sewage collected
disposal plant to be located near the northwest
trict near Sauquoit creek. This stream disch
about 3 miles below the disposal plant and at
the city of Utica and has a drainage area of a
above the proposed sewage disposal site consist
country having a fairly large urban and rural
age fall of about 100 feet per mile providing g
developments and this fact has been taken adv
and industrial establishments located along it
used for water supply purposes and receives,
amounts of industrial wastes, the sewage of Ne
1,200.

The site of the disposal plant appears to be
to the built up section of the sewer district.
entirely clear inasmuch as an abandoned or s
the general sewer plan and the proposed lay
should show only the sewers or structures cons
and the abandoned sewers or layout should b
order to avoid any possibility of misunderstan

The sewage upon reaching the disposal plant
and auxiliary sludge bed for the disposal of s
a screen chamber 4 feet wide provided with
circular rods spaced 2 inches apart on centers
coarse screen the sewage is to flow over a flat
flow settling tank of the Imhoff or Emscher ty
the tank and discharged directly into the strea
tank is divided into an upper or settling comp
compartment for the storage and decompositio
placed near both the inlet and outlet end of
purpose of retaining scum and other floating
be provided with a ventilator so designed as
with the flow of sewage through the tank.

The settling compartment has sufficient capa
tion of about two hours when serving the p
assuming a per capita rate of sewage contribut
that 1/18 of the flow reaches the tank per hou
compartment is equal to nearly ⅔ of the capac
and should be adequate to provide storage ca
of about 6 months. An 8-inch sludge pipe is
portion of the sludge chamber by means of w
off and discharged to an adjacent sludge bed h

3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs of other areas shall be admitted to the proposed sewers.

5. That no sewage from any part of the disposal works shall be discharged into the tributary to Sauquoit creek or any other watercourse.

6. That whenever required by the State Commissioner of Health satisfactory detailed plans for additional works for more complete treatment of the sewage from Sewer District No. 1 in the town of New Hartford and of the sewage from the village of New Hartford shall be submitted for approval and upon approval of said plans any or all portions of such additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

April 12, 1912

NORTH ELBA

Plans for a separate system of sewers in the Peninsular sewer district of the town of North Elba were approved on October 28, 1912, and a permit was issued to the sewer commissioners of the district on the same date, allowing the discharge into the Chubb river of sewage from the proposed sewers after such sewage shall first have been passed through the Lake Placid sewage disposal plant. The report on the examination of the plans and the permit are printed below.

ALBANY, N. Y., *October* 26, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a separate system of sewerage for the Peninsular sewer district in the town of North Elba, Essex county, submitted by the sewer commissioners thereof, said commission having been established under article XI of the Town Law.

These plans were submitted on October 17 and application for the approval of the plans signed by the sewer commissioners was received at this Department on October 19. The report of the designing engineer, Mr. J. H. Stevens, of Lake Placid, was received at this Department on October 26 together with a copy of the specifications.

The plans submitted comprise duplicate sewer maps showing the contour of the portion of the Peninsula in the southwesterly end of Lake Placid bordering the lake, duplicate profiles of the proposed sewer, and a sheet of details in duplicate. The report of the engineer states that the proposed sewer is intended to provide means for conveying the sewage from the cottages on this Peninsula to the trunk sewer of the Whiteface Inn sewer district and to thus avoid the necessity of disposing of the sewage by cesspools which at times overflow into the lake and menance the quality of the water supply of the village of Lake Placid which is derived from the lake.

The water supply is furnished to this district as well as to the Whiteface Inn and Ruisseaumont districts in the town of North Elba by the village of Lake Placid. The Whiteface Inn sewer plans were approved in 1906 under the provisions of article 11 of the Town Law. The proposed sewer is to discharge into Whiteface Inn sewer district at a point near where this latter sewer crosses Chubb river, the outlet of Lake Placid. The statement is made by the designing engineer and in the application that an agreement has been reached between the sewer commissioners of the two districts for the discharge of sewage from the Peninsular sewer district into

3. That both the sewer system and the sewage (
by plans approved this day shall be fully constru
formity with such plans or approved amendments
4. That only sanitary or domestic sewage, and n
face water from streets, roofs of other areas sha
proposed sewers.
5. That no sewage from any part of the dispos
charged into the tributary to Sauquoit creek or an
6. That whenever required by the State Commis
factory detailed plans for additional works for m
of the sewage from Sewer District No. 1 in the
and of the sewage from the village of New Hartf
for approval and upon approval of said plans any
additional or supplementary works for more
sewage shall be constructed and put in operation
thereafter as said Commissioner may designate.

ALE(
Acting State Co

April 12, 1912

NORTH ELBA

Plans for a separate system of sewers in the Pen
the town of North Elba were approved on October
was issued to the sewer commissioners of the dis
allowing the discharge into the Chubb river of se
sewers after such sewage shall first have been p
Placid sewage disposal plant. The report on the e
and the permit are printed below.

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to submit the following repo
plans for a separate system of sewerage for the
in the town of North Elba, Essex county, submitt
sioners thereof, said commission having been esta
of the Town Law.

These plans were submitted on October 17 an
proval of the plans signed by the sewer commissi
Department on October 19. The report of the des
Stevens, of Lake Placid, was received at this D
together with a copy of the specifications.

The plans submitted comprise duplicate sewer
of the portion of the Peninsula in the southwes
bordering the lake, duplicate profiles of the prop
details in duplicate. The report of the enginee
sewer is intended to provide means for convey
cottages on this Peninsula to the trunk sewer o
district and to thus avoid the necessity of disposin
which at times overflow into the lake and menan
supply of the village of Lake Placid which is deri

The water supply is furnished to this district
Inn and Ruisseaumont districts in the town of N
Lake Placid. The Whiteface Inn sewer plans w
the provisions of article 11 of the Town Law. T
charge into Whiteface Inn sewer district at
latter sewer crosses Chubb river, the outlet o
ment is made by the designing engineer and
agreement has been reached between the sewer
districts for the discharge of sewage from the P

NORTH PELHAM

On August 7, 1912, application was made by the b village of North Pelham for the approval of plan in the Pelhamwood district and in Highbrook, Wa avenue and other streets. These plans were approv and a permit was issued to the village authorities ing the discharge into Hutchinson river of sewage fi after such sewage shall first have been passed thro disposal works. The permit and report on the e follow.

ALBANY, ?

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to submit the following repo plans for proposed sanitary sewer extensions in the Westchester county, which were submitted to this by the board of trustees on August 7, 1912.

Plans for a comprehensive sewer system for the were approved on August 18, 1908, and on Decembe providing for changes in alignments of some of the approved. Final plans for complete sewage dis sewage from the three villages in the town of Pelham, were approved on June 1, 1910. Plans fo from the villages of Pelham and North Pelham to of these villages with the town sewage disposal pl jointly by them were approved on July 10, 1911.

The plans now under consideration show that it the existing 8-inch sewer in Fifth avenue between the village of North Pelham and to construct new s ington, Clifford avenues and other streets in t village known as Pelhamwood. This section is laid out on the park plan and the sewers are trib system of the village of Pelham which connects wi works.

The proposed sewers are to vary in size from 8- and manholes are to be placed at intervals of nc flush tanks at the upper ends of lateral sew slopes of the proposed sewers are not shown on t invert elevations of the sewers at the manholes th with slopes sufficiently steep to produce sel ordinary conditions.

From our careful examination of plans it sewers if properly constructed should be adequa to satisfactorily care for the sanitary sewage by them.

I would, therefore, recommend that the plan be issued allowing the discharge into Hutchi collected by the proposed sewers after such passed through the sewage disposal works of t located in Pelham Manor.

Respectfully sub

PERMIT

Application having been duly made to the as provided by section 77 of chapter 49 of t Health Law," as amended by chapter 553 of chapter 45 of the Consolidated Laws, permissi of trustees of the village of North Pelham

From our careful examination of the plans it is fou
in satisfactory condition for approval inasmuch as the
sewer if constructed in accordance with the plans wou
cause a considerable portion of the lower section to flow
should be avoided if possible especially when vitrified
water setting back in the sewer would also flatten the
the flow line and thereby reduce considerably the ca
sewer under ordinary conditions.

It appears that inasmuch as the cellar bottoms
above the sewer the plans may be amended either by
of the sewer and increasing the size if necessary to s
ing capacity, or by raising the entire sewer at least 1.8
native were adopted and the lower end of the sewer
feet the sewers according to the plan could, when ex
the canal without interfering with the flow in the po
necessitate the use of an inverted siphon.

If the entire sewer be raised it would in all pro
carry the sewage under the canal by means of an in
therefore, not be as desirable as the first alternative
sewer is to carry storm water as well as sanitary se
length of the sewer would probably also limit the
could be extended southerly in Lake street. The pla
plans will, however, of necessity, depend upon local

The extension of the city sewer system and espe
new outlets should receive careful study by the city
tion should be given in the design of such sewers
the outlet sewers sufficiently high to permit of th
it shall become necessary to intercept the sewage
into the St. Lawrence and Oswegatchie rivers at n
and to convey such sewage to suitable site or sites
at some future time.

I would therefore recommend that the plans b
general accordance with the recommendations emb

Respectfully

TH

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following re
revised plans for proposed sewer extensions in La
city of Ogdensburg which were resubmitted for
Public Works on November 13, 1912.

These plans were first submitted on October 2
examination of them by the Engineering Divisio
you under date of November 9, setting forth th
and making recommendations for certain amend
final acceptance of them. The plans were accor
city engineer on November 9 with recommenda
the proposed sewer be raised or that the entire
about 1.8 feet in order to prevent the water in
into the sewer and causing it to flow under pre

From our examination of the revised plans
sewer has been revised in general accordance w
and that the entire length of the sewer has b
size and slope remaining the same as that sh
appears that under the proposed conditions
enced from back water in the sewer, except f
during extreme high water stages in the river
back up in the sewer as far as the first man
of a little more than 100 feet, and no mate
capacity of the sewer should result therefrom

3. That the disposal works shown by plans approved this day, including the settling tank, pump well, sprinkling filter and sludge drying bed, shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That all wastes from the tannery shall be regularly passed through the settling tank and the sprinkling filter constructed in accordance with the plans.

5. That no sludge from any part of the disposal works shall be discharge or allowed to drain into Two Mile creek or any other watercourse.

6. That whenever required by the State Commissioner of Health additional works for more adequate or efficient treatment of the wastes from the tannery shall be constructed and put in operation within the time then specified in accordance with plans satisfactory to this Department.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

February 19, 1912

ONEONTA

On August 27, 1912, application was made by the board of public works for the approval of plans for a proposed sewer in Parish avenue, in the city of Oneonta. The plans were approved on August 27, 1912, and a permit was issued to the village authorities allowing the discharge into the Susquehanna river of sewage from the proposed sewer on condition that on or before October 1, 1912, plans for complete sewage disposal works to treat the entire sanitary sewage of the city be submitted for approval.

On October 28, 1912, application was made by the city authorities for the approval of plans for sewer extensions, intercepting sewers and sewage disposal works, plans for the same having been submitted on September 19, 1912. These plans were returned for revisions in respect to the proposed sewers on October 31, 1912. Plans revised in accordance with the recommendations of this Department were resubmitted for approval on November 22, 1912, and were approved on December 2, 1912. The permit issued in connection with the approval of these plans allows the discharge into the Susquehanna river of effluent from the proposed sewage disposal works consisting of pumping station, settling tanks, dosing tank, sprinkling filter, and final settling tank and auxiliary sludge bed. On December 2, 1912, the city of Oneonta was also notified to construct all portions of the sanitary intercepting and outfall sewers and the pumping station and settling tanks forming a portion of the sewage disposal works shown by plans approved on the same date and to have them completed and put in operation by September 1, 1914. The permit and reports on the examination of the plans follow.

ALBANY, N. Y., *August* 27, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sanitary sewer extensions in the city of Oneonta, Otsego county, which were submitted to this Department for approval by the board of public works on August 27, 1912.

The records of the Department show that a sewer system has been in existence in the city for some years and a general plan of the city showing all sewers constructed up to the year 1905 was submitted by the city officials in accordance with chapter 468 of the Laws of 1903, but no plans for sewers were ever submitted for approval or approved by this Department until August 12, 1909, when plans for proposed sewer extensions in Fonda avenue, Chestnut, West Broadway and Gilbert streets were submitted for approval.

These plans were approved on September 22, 1909, and the permit issued by you in connection with approval of these plans contained, in addition to the usual revocation and modification clauses, the condition:

> That on or before April 1, 1911, plans satisfactory to this Department for complete sewage disposal works to treat the entire sanitary sewage of the city of Oneonta, accompanied by a proper application for the approval thereof, shall be submitted to this Department for approval, together with plans for such intercepting and outfall sewers as may be necessary to convey the sanitary sewage of the city to the site or sites selected for such sewage disposal works.

This condition of the permit has not been complied with. The sewer commissioners of the city, however, stated in a conference with Mr. F. D. Beagle, chief clerk of the Department, on August 3, 1912, that complete plans for intercepting and outfall sewers and for sewage disposal works were being prepared and were nearly completed and that such plans would be submitted to this Department as soon as possible so that there would be no further delay in the matter.

The plans now before the Department and under consideration show that it is proposed to construct an 8-inch sanitary sewer in Parish avenue, between River street and West Broadway, a distance of some 586 feet. The proposed sewer, which is to be constructed with a slope of .55 per cent., is to be tributary to the existing sewer in West Broadway, and the sewage to be collected by it is to be discharged into the Susquehanna river at the foot of Miller street extended.

From our careful examination of the plans it is found that the proposed sewer if properly constructed should be adequate as to size and capacity to satisfactorily care for the section to be served by it.

In view of the above, and inasmuch as the plans for sewerage and sewage disposal for the city are nearly completed, I would recommend that the plans be approved and a permit be issued, allowing the discharge of sewage from the proposed sewer into the Susquehanna river, on condition that plans for intercepting and outfall sewers and for sewage disposal works to intercept and treat the entire sanitary sewage of the city be submitted to this Department for approval by October 1, 1912.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application have been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of public works of the city of Oneonta to discharge sewage from the proposed sewer in Parish avenue into the waters of Susquehanna river at the foot of Miller street extended, within the municipality of Oneonta, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
4. That on or before October 1, 1912, plans satisfactory to this Department for complete sewage disposal works to treat the entire sanitary sewage of the city of Oneonta, accompanied by a proper application for the approval thereof, shall be submitted to this Department for approval,

3. That the disposal works shown by plans appr ing the settling tank, pump well, sprinkling filter a shall be fully constructed in complete conformity approved amendments thereof.

4. That all wastes from the tannery shall be reg the settling tank and the sprinkling filter construct the plans.

5. That no sludge from any part of the disposa charge or allowed to drain into Two Mile creek or a

6. That whenever required by the State Commiss tional works for more adequate or efficient treatme the tannery shall be constructed and put in opera then specified in accordance with plans satisfactory

ALEC H. S

Acting State Com

February 19, 1912

ONEONTA

On August 27, 1912, application was made by the b for the approval of plans for a proposed sewer in Pari of Oneonta. The plans were approved on August 27, 19 issued to the village authorities allowing the discharge river of sewage from the proposed sewer on conditic October 1, 1912, plans for complete sewage disposal wor sanitary sewage of the city be submitted for approval.

On October 28, 1912, application was made by the ci approval of plans for sewer extensions, intercepting disposal works, plans for the same having been sub 19, 1912. These plans were returned for revisions in re sewers on October 31, 1912. Plans revised in accord mendations of this Department were resubmitted for a 22, 1912, and were approved on December 2, 1912. ' connection with the approval of these plans allows tl Susquehanna river of effluent from the proposed se consisting of pumping station, settling tanks, dosing t and final settling tank and auxiliary sludge bed. On 1 city of Oneonta was also notified to construct all por intercepting and outfall sewers and the pumping stati forming a portion of the sewage disposal works show on the same date and to have them completed and September 1, 1914. The permit and reports on the exa follow.

ALBANY, N. Y

EUGENE H. PORTER, M.D., *State Commissioner of Healt*

DEAR SIR: — I beg to submit the following report o plans for proposed sanitary sewer extensions in the cit county, which were submitted to this Department for a of public works on August 27, 1912.

The records of the Department show that a sewer existence in the city for some years and a general plan all sewers constructed up to the year 1905 was su officials in accordance with chapter 468 of the Laws of 1 sewers were ever submitted for approval or approved until August 12, 1909, when plans for proposed sewer avenue, Chestnut, West Broadway and Gilbert streets approval.

These plans were approved on September 22, 1909, a by you in connection with approval of these plans co to the usual revocation and modification clauses, the co

Each tube of these siphons is to have a capacity nearly equal to that of the intercepting sewer at the crossing and are so arranged that either or both tubes of the siphons may be operated at a time. The sewage in each case is to be passed through a coarse screen to be located in manholes at the upper ends of the siphons.

It is found from our careful examination of the plans that the proposed intercepting and outfall sewer if properly constructed so as to prevent excessive infiltration of ground water should have sufficient capacity to care for the probable future maximum rate of contribution of sewage from the city.

It is proposed to treat the sewage collected by this sewer in a sewage disposal plant located near the southwestern corner of the city on the north bank of the Susquehanna river. This stream has an area above this point of approximately 700 square miles and has a fairly large rural and urban population on its watershed. No unfiltered water supply is derived from the Susquehanna river between Oneonta and Binghamton, a distance of about 86 miles from Oneonta measured along the river.

The proposed sewage disposal works, which is to consist of a pumping station, two settling tanks, one dosing tank, a sprinkling filter, final settling tank and two sludge beds appears to be favorably located with respect to the city itself. Provisions are made by the plans for the future installation of an additional unit of the settling tank, dosing chamber, sprinkling filter, final settling tank and sludge bed.

The sewage upon reaching the disposal plant is to be discharged into a pump well in the pumping station after having been passed through a coarse bar screen consisting of ½-inch to 2-inch bars spaced 2 inches apart in the clear. In the dry well of the pumping station is to be installed three centrifugal pumps operated by electric motors. These pumps which are to be 6, 8 and 12-inch pumps are to be controlled automatically and are to be so arranged as to give as nearly a continuous flow of sewage through the settling tank as practicable. The pumps have a combined capacity of about 10,000,000 gallons per day, which should be adequate to care for the probable maximum contribution of sewage. Provisions are made, however, for the installation of an additional 12-inch pump in the future.

From the pump well the sewage is to be discharged through a 24-inch force main into a distributing trough of the proposed settling tanks. These tanks are to be horizontal flow tanks of the Imhoff type and the outlets and inlets are so arranged that the flow through the tanks may be reversed in order to give a more uniform distribution of sludge in the sludge compartments than would otherwise be obtained.

Each of the two tanks are divided by means of partition walls into two upper or settling compartments and two lower or sludge compartments for the storage and digestion of sludge. The two settling compartments of each tank have sufficient capacity to give about 2¼ hours' detention when treating the sewage of the present population, assuming a per capita water consumption of 150 gallons per day, which is the basis used in the design. The capacity of the sludge compartments is somewhat larger than that of the settling compartment and should be more than ample to provide storage facilities for the sludge for a period of six months or more. The sludge is to be removed from the sludge compartments by means of sludge pipes which connect with the lower portions of the tank and through which the sludge is to be discharged by gravity flow to adjacent sludge beds.

The clarified effluent from the settling compartments is to flow through submerged outlets into the collecting trough from which it will be discharged by gravity through 24-inch pipe into a dosing chamber located adjacent to the sprinkling filter. This chamber is provided with a 16-inch automatic discharge siphon and has a capacity of about 2,500 gallons. This is equal to about 2 minutes' flow of sewage, so that the operation of the sprinkling filter will be almost continuous and should therefore tend to prevent freezing of the nozzles during severe winter weather.

This sewage from the dosing tank is to be discharged by means of a 16-inch siphon into the distributing system of the sprinkling filter. This filter is

Each tube of these siphons is to have a capacity nearl the intercepting sewer at the crossing and are so arrang both tubes of the siphons may be operated at a time. T case is to be passed through a coarse screen to be locate the upper ends of the siphons.

It is found from our careful examination of the plans intercepting and outfall sewer if properly constructed excessive infiltration of ground water should have sufficient for the probable future maximum rate of contribution the city.

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This sewage from the dosing tank is to be discharged by means of a siphon into the distributing system of the sprinkling filter. This

It is proposed to treat the sink drainage of the camp in a disposal plant consisting of a settling tank, dosing chamber and subsurface irrigation field.

The settling tank which is to be 4 feet by 4 feet by 4 feet deep is provided with submerged inlet and outlet and will have sufficient capacity to give an average period of detention of about 18 hours when serving maximum population of 80 persons assuming a per capita rate of water consumption of 10 gallons per capita.

From the settling tank the effluent is to flow through a submerged outlet into a dosing chamber having a capacity of about 75 gallons. It is to be provided with a hand operated plug valve by means of which the effluent is to be discharged into the distributing system of the subsurfaced irrigation field which is divided into two portions. The distributing system is to consist of about 200 feet of 6-inch horseshoe tile to be laid at distances of not less than 50 feet from the water's edge of the lake, and therefore meets the requirements of the rules and regulations for the protection from contamination of the Peekskill water supply, provided no overflow of the system is permitted.

According to the report of the engineer, the soil is suitable for land treatment and the proposed irrigation system if properly constructed will possibly fully care for the settling tank effluent on the basis of design used, provided the plant is operated with care and efficiency. The adequacy of the system is a difficult matter to determine in advance inasmuch as it depends upon the topography, the slope of the ground, the nature and character of the soil, the elevation of the ground water, and other local conditions. There appears, however, to be sufficient area available to permit of an extension of the system should it become overtaxed or overflow.

I would, therefore, recommend that the plans be approved on condition that the proposed subsurface irrigation system be extended should any overflow of the same occur.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

OSWEGO

Plans for sewerage and sewage disposal for the city of Oswego were submitted for approval by the Commissioner of Works on May 21, 1912. The plans were approved on May 28, 1912, and a permit was issued to the city authorities on the same date, allowing the discharge into Lake Ontario of effluent from the sewage disposal works to be constructed in connection with the proposed sewer extensions and intercepting sewers on both the east and west sides of the Oswego river. This permit contains the condition that detailed plans for preliminary treatment works to treat the entire sanitary sewage of the East Oswego sewer districts together with plans for supplementary or more complete treatment of such sewage be submitted for approval on or before March 1, 1913.

On July 31, 1912, plans for a temporary sewage disposal plant for the State Normal School in the city were submitted for approval by the city authorities. These plans were approved on August 5 and a permit was granted to the common council of the city on the same date, allowing the discharge into a small steam tributary to Lake Ontario, of effluent from the proposed sewage disposal plant consisting of a settling tank and chlorination plant.

Plans for a proposed sewer in Syracuse avenue were approved on October 11, 1912, having been submitted for approval on October 9. On November 8, 1912, plans for a proposed sewer in Canal street were approved. The permits issued in connection with the approval of the last two sets of plans were similar to the permit issued on May 28, 1912. Permits and reports on the examination of the plans approved follow.

It is proposed to treat the sink drainage of the camp consisting of a settling tank, dosing chamber and subsu
The settling tank which is to be 4 feet by 4 feet by 4 with submerged inlet and outlet and will have sufficient average period of detention of about 18 hours when servi tion of 80 persons assuming a per capita rate of wate gallons per capita.

From the settling tank the effluent is to flow througl into a dosing chamber having a capacity of about 75 gall vided with a hand operated plug valve by means of wh be discharged into the distributing system of the subsui which is divided into two portions. The distributing sy about 200 feet of 6-inch horseshoe tile to be laid at dist 50 feet from the water's edge of the lake, and therefore m of the rules and regulations for the protection from Peekskill water supply, provided no overflow of the sys

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I would, therefore, recommend that the plans be appr the proposed subsurface irrigation system be extended s the same occur.

Respectfully submitted

THEOD

OSWEGO

Plans for sewerage and sewage disposal for the city mitted for approval by the Commissioner of Works o plans were approved on May 28, 1912, and a permit authorities on the same date, allowing the discharge effluent from the sewage disposal works to be construc the proposed sewer extensions and intercepting sewers west sides of the Oswego river. This permit contains tailed plans for preliminary treatment works to tre sewage of the East Oswego sewer districts together wit tary or more complete treatment of such sewage be s on or before March 1, 1913.

On July 31, 1912, plans for a temporary sewage dispo Normal School in the city were submitted for approv ties. These plans were approved on August 5 and a the common council of the city on the same date, allow a small steam tributary to Lake Ontario, of effluent fro disposal plant consisting of a settling tank and chlori

Plans for a proposed sewer in Syracuse avenue wer 11, 1912, having been submitted for approval on Oct 8, 1912, plans for a proposed sewer in Canal street we mits issued in connection with the approval of the last similar to the permit issued on May 28, 1912. Perm examination of the plans approved follow.

According to the plans and report of the engine these sewers into sanitary sewers and to dischar lected by them into the so-called west side sanit structed in First avenue, Turrell and Singleton s street to the proposed sewage disposal plant nea Buren street and First avenue, plans for which p Department on March 3, 1911. The proposed trun 12 inches to 36 inches in diameter and it is to sufficiently steep to produce self-cleansing velocities

It is proposed to cross the creek at two points inverted siphons so arranged that either or both time. The siphon at Ruth street is on a 21-inch li 8-inch cast-iron pipes about 10 feet long. A diffe feet is provided for between the upper and the low

The other inverted siphon is to be located on t street between Van Buren and West Schuyler stree tubes of 21-inch cast-iron pipe about 24 feet long. trolled by a gate valve, is to be installed at the u be used presumably only in case of emergency. An thing less than one inch is provided for at this siph of head through the siphon, under ordinary conditi velocity heads, will probably be considerably in exc little difficulty should be experienced from retarded inasmuch as additional operating head will be obt sewage setting back in the sewer. It appears, mor difficult to obtain a greater operating head through the sewer is to be constructed on a minimum slope at would be impracticable to secure additional head by tween the siphon and the disposal plant since it wo reduce the operating head at the disposal plant. Th of the siphon should, however, be enlarged in order head at these points as far as practicable.

The so-called River District west of the Oswego r a comparatively narrow strip of land between Sevent about 380 acres in extent, comprises the more densel the city on that side of the river. It is provided with system on the combined plan which discharges into th Varick canal at the foot of nearly all of the streets le

It is proposed to intercept the dry weather flow of se by means of an intercepting sewer, varying in size from in diameter. This sewer is to be constructed along th intersection of Ellen street with West street river road station to be located near the intersection of Van Bur From this point it is proposed to pump the sewage thr iron force main to a proposed manhole in Lake street with Montcalm street, from which point the sewage is the west side sewage disposal plant.

No details of the intercepting manholes and pumpi on the plans. Such details, showing the method of ir lating the flow tributary to the intercepting sewer tog the proposed pumping station, should be presented for construction of them is commenced.

With reference to the treatment of the sewage from west of the river, it is found that the proposed sewag which plans were approved on March 3, 1911, was desi creek district only and that the plans for sewerage now contemplate the discharge of the dry weather flow of se district into the gravity system and sewage disposal pla trict. It will therefore be necessary to enlarge or extend at an earlier date than was anticipated when the plans creek district were under consideration.

The problem of collecting the sewage and providing sewerage facilities for the east side of the Oswego river is similar to that on the west side. Like the west side this section of the city also appears to be naturally divided into a creek district and a river district and the conditions with reference to sewerage are very similar except that the section requiring pumping in order to convey the sewage to the disposal plant is considerably smaller on the east side of the river than on the west side and comprises a comparatively small area near the river south of Utica street.

The plans show that it is proposed to construct a comprehensive sanitary sewer system to serve the creek district which is, as in the case of the creek district on the west side of the river, the more sparsely settled and undeveloped section of East Oswego. The trunk sewer which is to vary in size from 12 inches to 36 inches is to extend, in East Tenth, Cayuga, East Eleventh and Marion streets from Church street, to a proposed disposal plant site near the lake shore. The lateral sewers are for the most part to be 8 inches and 10 inches in diameter.

The plans also show a 12-inch sewer in East Eleventh street extending from the 36-inch trunk sewer at the intersection of Marion and East Eleventh streets to the lake. It was explained by the city engineer at the conference held in this office that this outlet sewer was to be used temporarily until the sewage disposal plant for the east side sewer districts is constructed.

This sewer, however, should not be constructed inasmuch as the sewage disposal plant for the east side sewer district should be constructed before the intercepting sewers are put into use.

An intercepting sewer of from 15 inches to 36 inches in diameter is to be constructed along the river and lake fronts from East Utica street to the proposed trunk sewer in East Eleventh street at the intersection of Mercer street for the purpose of collecting the dry weather flow of sewage which is now being discharged into the Oswego river and hydraulic canal at some seven different points. Another smaller intercepting sewer is to convey the dry weather flow of sewage from that section of the river district between East Utica and Oak streets to a pumping station to be located near the foot of Hubbard street and from which this portion of the sewage is to be pumped into the main intercepting sewers.

The same criticism as to the lack of details of intercepting manholes and pumping station, made with reference to the west side sewer district, is also applicable to the east side and plans for such details should be submitted for approval before the proposed intercepting sewer and pumping station are constructed.

From our careful examination of the plans it would appear that the sewerage problem of the city of Oswego has been dealt with in a comprehensive and satisfactory manner and that the proposed sewer systems if properly constructed should satisfactorily care for the sanitary sewage of the districts to be served by them.

With reference to sewage disposal for the east side of the river it appears that the permit granted to the common council of the city of Oswego on November 10, 1911, in connection with the approval of plans for the then proposed trunk sewer in East Eleventh street contains in addition to the usual revocation and modification clauses the provision that satisfactory detailed plans for the partial treatment in settling, sedimentation or septic tanks of the entire sanitary sewage to be collected by the proposed intercepting and outfall sewers together with plans showing location, general arrangement and type of additional works for more complete treatment of such sewage, shall be submitted to this Department for approval on or before March 1, 1912.

In view of the fact that the present plans constitute amendments to the plans for sewerage and sewage disposal for East Oswego and inasmuch as the provisions of the permit formerly granted to the city authorities with reference to the submission of plans for intercepting sewers on the east side of the Oswego has been partially complied with by the submission of the present plans which show also the location and general arrangement of preliminary and supplementary treatment works it would appear that an extension or modification of such permit could properly be considered at this time.

I would therefore recommend that the plans be ap
be issued allowing the discharge into Lake Ontario
posed outfall and intercepting sewers after such sew
passed through the proposed sewage disposal plan
contain in addition to the usual revocation and
conditions that the inverted siphon on First street b
with the suggestions embodied in this report and the
submitted for approval on or before March 1, 1913:

(1) Detailed plans for intercepting manholes s
lating the quantity of sewage to be intercepted
cepting manholes to be constructed in connectio
sewers on both sides of the Oswego river;

(2) Detailed plans of proposed pumping stati
ments;

(3) Detailed plans for preliminary treatment w
sanitary sewage of the East Oswego sewer distri
for supplementary or more complete treatment of

Respectfully su
THEO

PERMIT

Application having been duly made to the State Co
as provided by section 77 of chapter 49 of the Laws
Health Law," as amended by chapter 553 of the Laws
chapter 45 of the Consolidated Laws, permission is he
mon council of the city of Oswego to discharge effluent
posal works to be constructed in connection with the pro
and intercepting sewers on both the east and west side
into the waters of Lake Ontario at the points shown by
municipality of Oswego in accordance with the plans a
tion, under the following conditions:

1. That this permit shall be revocable at any tim
fication or change when in the judgment of the S
Health such revocation, modification or change shal

2. That the issuance of this permit shall not be de
way action by this Department on any future a
be made for permission to discharge additional sewag
waters of this State.

3. That both the sewer systems and the sewage d
by the plans approved this day and the sewage disp
plans approved on March 3, 1911, shall be fully con
conformity with such plans or approved amendment

4. That only sanitary or domestic sewage and no
face water from streets, roofs or other areas shall
proposed sewers except in the case of sewers shown
combined sewers from which the dry weather flow
shall be intercepted and conveyed to the sewage disp

5. That no sewage sludge from any part of eith
works shall be discharged into the Oswego river, La
other watercourse.

6. That the construction of the inverted siphon in
comply with the recommendations in the Chief Engin
panying the approved plans.

7. That on or before March 1, 1913, there shall be
Department for approval satisfactory plans as follow

(A) Detailed plans for intercepting manholes s
regulating the quantity of sewage to be intercepte
intercepting manholes to be constructed in connecti
cepting sewers on both sides of the Oswego river.

(B) Detailed plans of the proposed pumping stations and pumping equipments.

(C) Detailed plans for preliminary treatment works to treat the entire sanitary sewage of the East Oswego sewer districts together with plans for supplementary or more complete treatment of such sewage.

8. That the sewer in Eleventh street from Marion street to Lake Ontario shown by the approved plans shall not be constructed.

9. That before October 1, 1913, all the proposed intercepting sewers and sewage disposal works on both sides of the Oswego river to collect and treat the entire sanitary sewage of the city shall be constructed and put in operation.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

May 28, 1912

ALBANY, N. Y., *July* 31, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for temporary sewage disposal for the new State Normal School in the city of Oswego, Oswego county, which were submitted for approval by the Commissioner of Works on July 31, 1912.

Plans for comprehensive sanitary sewer systems and sewage disposal works serving the entire city, including the new State Normal School, were approved by this Department on May 28, 1912, but the construction of these systems has not been commenced. According to advices received from the city officials the Normal School, which is now under construction, will be ready for occupancy by September 1 of this year and it is necessary for them to provide for at least a temporary means of sewage disposal for the school until the general city sewerage systems are constructed.

The plans now submitted and under consideration show that it is proposed to construct a sanitary sewer in general accordance with the general plan approved on May 28, 1912, in Seventh avenue and West Schuyler street from the Normal School to the small stream which flows through the western portion of the city and empties into Lake Ontario near the proposed site of the West side disposal plant and to temporarily treat the sewage from the Normal School before its discharge into this stream in a sewage disposal plant to be located near the upper end of the proposed sewer.

These disposal works are to consist of a settling or sedimentation tank with screens and a sterilization plant.

The settling tank, which is rectangular in plan, is 4 feet by 12 feet by 5 feet deep with a depth of flow of 4 feet and has sufficient capacity to provide for an average time of detention of about 2 hours when treating 16,000 gallons of sewage per day which, according to the plans, is the basis used in the design. Two vertical screens are to be placed at the 1/3 points of the tank. The first screen is a bar screen with ½-inch openings and the other is to be 4-inch mesh screen. Hypochlorite of lime in the ratio of about 15 parts per million is to be applied to the sewage near the outlet end of the settling tank.

The hypochlorite plant which is to consist of a chemical mixing tank, solution tank, constant level tank and orifice tank, is to be placed in the school building and the required amount of solution, to be determined by experiment, is to be conveyed to the settling tank through a ¾-inch lead pipe. The treated effluent is also to be passed through a small outlet tank located near the intersection of First avenue and West Schuyler street before its discharge into the creek at this point.

The rate of application of hypochlorite of lime to the sewage as stated by the plans is proposed to be 125 pounds per million gallons of sewage or 15 parts per million of chlorite of lime, corresponding to about 5 parts per million of available chlorine. This rate of application might be sufficient for sprinkling filter effluents or for effluents from a large settling tank, but under

the circumstances of this installation, I am of th
application should be double that proposed by the p
From our careful examination of the plans it w
posed sewage disposal plant if properly constructe
and efficiency should produce an effluent which ma
ency, be discharged into the small stream tributary
objection at present provided the rate of application
doubled over that shown by the plans. This disc
discontinued and the sewage from the Normal Scho
the general sewerage and sewage disposal systems
west side of the Oswego river as soon as these syst
I would therefore recommend that the plans be a
issued allowing temporarily the discharge of effluent
disposal works into the small stream tributary to La

Respectfully submit

THE

PERMIT

Application having been duly made to the State (
as provided by section 77 of chapter 49 of the Law
Health Law," as amended by chapter 553 of the La
chapter 45 of the Consolidated Laws, permission is h
mon council of the city of Oswego to discharge efflue
posal plant to treat the sewage from the State Normal
nue into the waters of a small stream tributary to L
Schuyler street within the municipality of Oswego i
plans accompanying the petition, under the following

1. That this permit shall be revocable at any ti
fication or change when in the judgment of the
Health such revocation, modification or change sh
2. That the issuance of this permit shall not be
way action by this Department on any future ap
made for permission to discharge additional sewa
waters of this State.
3. That both the sewers and sewage disposal wor
proved this day shall be fully constructed in com
such plans or approved amendments thereof.
4. That only sanitary or domestic sewage, and n
face water from streets, roofs or other areas shal
proposed sewers or sewage disposal works.
5. That no sewage sludge from any part of the di
discharged into the stream tributary to Lake Ontar
or any other watercourse.
6. That after October 1, 1913, the sewage to be
posed sewer shall be discharged into the interceptin
disposal works to be constructed in accordance with
permit issued on May 28, 1912.
7. That hypochlorite of lime shall be added to the
250 pounds per million gallons of sewage flowing in
indicated on the plans.

EUGENE

State Comm

August 15, 1912

ALBANY, N. Y.,

EUGENE H. PORTER, M.D., *State Commissioner of Health.*

DEAR SIR: — I beg to submit the following report on
plans for proposed sewer extensions in the city of Oswe
which were submitted to this Department for approval on

Plans for sewerage and sewage disposal for the entire city were approved by this Department on May 28, 1912. These plans provided for comparatively short sections of 10 and 15-inch sewers in Syracuse avenue between Hamilton and Burckle streets, all of which were to be tributary to the proposed sewers in intersecting streets, which in turn were to be intercepted by intercepting sewers to be constructed along the river front on the east side of the Oswego river.

The plans now before the Department and under consideration show that it is proposed to construct an 8-inch sewer in Syracuse avenue between Hamilton and Burckle streets which is to be tributary to the existing 15-inch sewer in Hamilton street which now discharges into the hydraulic canal near the foot of this street extended. This sewer will ultimately be intercepted by the proposed intercepting sewer on the east side of the river for which plans were approved by this Department on May 28, 1912.

The proposed sewer in Syracuse avenue is to be constructed with a slope of .35 per cent. and if properly constructed should be adequate as to size and capacity to satisfactorily care for the sanitary sewage of the section to be served by it.

I would therefore recommend that the plans be approved and a permit be issued allowing the temporary discharge of sewage from the proposed sewer into the hydraulic canal and that the permit contain in addition to the usual revocation and modification clauses the same requirements in reference to sewage disposal as are contained in the permit granted to the common council on May 28, 1912.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

These plans were approved on October 11, 1912, and the permit issued in connection with the approval of them is similar to the permit issued on May 28, 1912.

ALBANY, N. Y., *November* 2, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sewer extensions in Canal street in the city of Oswego, Oswego county, submitted to this Department for approval on October 29, 1912, accompanied by an application for their approval and the issuance of a permit in connection therewith signed by Mr. John Smith, Commissioner of Works.

The plans for sewerage and sewage disposal for the entire city were approved by this Department on May 28, 1912. These plans provided for comparatively short sections of 10-inch sewers in Canal street between Division and Cochrane streets tributary to the sewer passing westerly through Hubbard street and to the outlet sewer from Canal street near Cochrane street to the proposed intercepting sewer along the hydraulic canal.

The plans now before the Department and under consideration show that it is proposed to construct an 8-inch sewer on a slope of .35 per cent. in Canal street between Hubbard street and Division street discharging into the existing 18-inch sewer north of Scriba street and to construct the 8-inch sewer on a gradient of .5 per cent. from Hubbard street southerly to the existing 30-inch sewer crossing Canal street south of Hubbard street. These sewers are tributary to the hydraulic canal but the sewage to be collected by them will ultimately be intercepted by the proposed intercepting sewer on the east side of the Oswego river for which plans were approved by this Department on May 28, 1912.

The proposed sewers if properly constructed should be adequate as to sizes and capacities to satisfactorily care for the sanitary sewage of the section to be served by them.

I would therefore recommend that the plans be approved and a permit be issued allowing the temporary discharge of sewage from the proposed sewers into the hydraulic canal and that the permit contain in addition to the usual

revocation and modification clauses the same requi
sewage disposal as are contained in the permit gran
on May 28, 1912.

Respectfully submi
THE

These plans were approved on November 8, 1912, connection with the approval of them is similar to tl 28, 1912.

PALATINE BRIDGE

Plans for sewerage and sewage disposal were subm board of trustees of the village of Palatine Bridge on were returned to the village authorities for modificati ber 21 inasmuch as they were not in satisfactory co ance. Plans revised in general accordance with the Department were resubmitted on January 2, 1912, March 13, 1912, after the matter of the discharge o posed sewage disposal plant of the village into the bar up with the State Engineer. The permit issued in proval of the plans allows the discharge into the Moha the proposed sewage disposal plant to be constructed proposed sewer system of the village. The permit an nation of the plans follow.

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of Heal*

DEAR SIR: — I beg to submit the following report plans for sewerage and sewage disposal for the villa Montgomery county, submitted to this Department for of trustees on September 28, 1911.

The village of Palatine Bridge is situated in the sout of Palatine on the Mohawk river. It is provided wit supply furnished by the Canajoharie Water Co.

The present population of the village, according to approximately 390 and the area of the village is about average density of population of about one person per population during the past decade has been rather slow sumed density of 10 persons per acre, it is estimated that might ultimately contribute sewage to the proposed s approximately 3,500.

The plans provide for a comprehensive sewer system c streets in the village, but, according to the report of the it is proposed to construct only a portion of the prop street from a point some 1,400 feet west of Center str 1,200 feet east of the bridge across the Mohawk river, 4,100 feet, and a disposal plant consisting of a settling ta the lower end of this sewer. No application, however, ha the village authorities asking for permission to omit any system as required by the Village Law.

It appears from the plans and date submitted that it i vey all of the sewage of the village to one point for disp ing to pumping, or without constructing a long intercepti river so that when the remainder of the sewer system sho constructed, as is contemplated, according to the engineer's posal plant similar to that shown on the plans now subr structed in the western section of the village between the & Hudson River Railroad tracks and the Mohawk river. posal plant have not been submitted nor is a site shown on

The plans have been carefully examined and it is found that the proposed sewers are to have straight alignments and either manholes or lampholes are to be constructed at all points of change of slope or alignment. In order to facilitate cleaning and flushing, manholes should be substituted for lampholes at all points of change of slope or alignment.

The proposed sewers are to be constructed with slopes sufficiently steep to produce self-cleansing velocities under ordinary conditions, and if properly constructed should be adequate as to sizes and capacities to satisfactorily care for the sanitary sewage of the village.

It is proposed to treat the sewage collected by the portion of the sewer system to be constructed at present in a covered settling tank located near the eastern portion of the village north of Grand street. Although the site is located adjacent to the public highway, it appears that a more suitable site could not be obtained without pumping the sewage, and if the plant is operated with care and efficiency no nuisance should be created. Should any offensive odors arise from the operation of the plant proper means for ventilation could be provided to avoid the creation of a nuisance.

The sewage, upon reaching the disposal plant, is to be discharged into a controlling manhole provided with channels and stop planks so arranged that the sewage can be discharged through separate inlets into either or both of the two equal compartments of the settling tank. The tank which is to be provided with baffles for the retention of scum and other floating material, varies in depth from 12 feet at the inlet to 6 feet near the outlet and has sufficient settling capacity to give about 6 hours' detention of sewage when serving a population of 400 persons contributing sewage at the rate of 100 gallons per capita per day, which is the basis used in the design. The lower portion of the tank is of adequate capacity to provide for the storage of sludge for a period of about 6 months when treating sewage at the rate of 40,000 gallons per day. Sludge pipes controlled by what appears from the plans to be shear gates located at the low point of the tank are provided so that the sludge can be discharged to an adjacent sludge well by gravity flow and from which it will be pumped and disposed of by hauling away and ploughing into the ground.

The effluent is to be discharged into the Mohawk river through an 8-inch pipe some 180 feet long and the plans show a by-pass by means of which the settling tank can be by-passed and the raw sewage from the sewer system discharged without treatment directly into the Mohawk river through the effluent pipe. It is presumed that it is the intention of the design to use this by-pass only in case of emergency. Such an arrangement, however, is not necessary, inasmuch as the settling tank is to be divided into two compartments, each of which can be operated independently of the other and the by-pass should therefore be omitted.

The plans of the settling tank are somewhat lacking in details inasmuch as the lateral sludge pipes shown on transverse section "C D" are not shown on the plan of the settling tank and the main sludge pipe is not shown on the longitudinal section "A B."

It would seem, also, that the outside walls, and especially the partition wall of the settling tank, are unnecessarily heavy, if they are to be constructed of proper material, and might be reduced in weight, thereby effecting a considerable saving in the cost of construction of the tank.

From a careful examination of plans it appears that they are not in satisfactory condition for approval and that they should be modified or amplified in accordance with the following recommendations before the final acceptance of them:

1. Manholes instead of lampholes should be installed at all points of change of slope or alignment.

2. The by-pass shown on the plans at the disposal plant should be omitted.

3. Detailed plans of preliminary treatment works to care for the sewage to be contributed from the western portion of the village should be submitted and the proposed site of such works should be shown on the gen-

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer system and sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into the Mohawk river or any other watercourse.

6. That whenever required by the State Commissioner of Health, satisfactory detailed plans for the additional works for more complete treatment of the entire sewage of the village as generally shown upon the plans approved this day shall be submitted for approval; and upon approval of said plans any or all portions of such additional or supplementary works for more complete treatment of sewage shall be constructed and put in operation at such time or times thereafter as said commissioner may designate.

EUGENE H. PORTER,
State Commissioner of Health

March 13, 1912

POCANTICO HILLS (St. Joseph's Normal College)

Plans to serve the annex to the St. Joseph's Normal College at Pocantico Hills, Westchester county, were first submitted for approval on June 20, 1912, and, after an examination of them, were returned for revision on June 24, 1912, revised plans were resubmitted on July 8, but were again returned for correction and amendment inasmuch as they were not in satisfactory condition for approval. Plans revised in general accordance with recommendations of this Department were finally submitted on July 24 and were approved on August 5 on the condition that the sub-surface irrigation system when constructed be extended so that there will be 60 lineal feet of tiling per capita served, the lines of underdrains to be spaced not less than 4 feet apart. No permit was issued in connection with the approval of these plans inasmuch as no discharge of sewage or sewage effluent into any watercourse was contemplated by them. The reports on the examinations of the plans follow.

ALBANY, N. Y., *June* 21, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for sewage disposal to serve an annex to the St. Joseph's Normal College at Pocantico Hills, Westchester county, which plans were submitted for approval on June 20, 1912.

Plans for sewage disposal for the Normal College consisting of settling tank and broad irrigation fields were approved on February 26, 1906. This disposal plant which was subsequently constructed and put into operation serves the main building and laundry of the institution. It was estimated by the designing engineers of the plant that the maximum population to be served by it would probably reach 300.

The plans now before the Department show that it is proposed to construct a sewage disposal plant to care for the sewage from a new building or annex to the Normal College. It appears that this new building will accommodate from 30 to 50 students. The plans, however, do not show the relative location of this building with reference to the main building of the institution nor the location of the proposed disposal plant with reference to the institution

From a careful examination of the amended plans it appears that they have been revised in general accordance with the above recommendations. Manholes are to be installed at all points of change of slope or alignment and the by-pass shown on the original plans in connection with the settling tank to serve the eastern portion of the village has been omitted.

The design of the settling tank has also been changed by substituting a reinforced concrete partition wall between the two compartments of the tank for the heavier gravity section shown by the plans as first submitted and the capacity of the tank has been decreased somewhat so that based on a daily flow of 40,000 gallons and assuming an effective depth of sewage of 6 feet, a time of detention of about 4½ hours will be obtained instead of 6 hours as provided for by the original design. If properly constructed in accordance with the plans and operated with care and efficiency the proposed settling tank should satisfactorily meet the requirements for sewage disposal for the village for a reasonable period in the future considering the fact that this settling tank is to serve only a portion of the total population of the village which according to the 1910 census is only about 390, at present.

General plans for supplementary or more complete treatment of sewage than that provided for by settling or sedimentation were submitted with the present plans. These supplementary treatment works which is to consist of a sprinkling filter and final settling basin are to be located about 100 feet north of the proposed settling tank and at an elevation of about 20 feet above it. The design contemplates pumping the sewage from the settling tank to the dosing chamber serving the sprinkling filter.

Detailed plans for a settling tank to serve the western portion of the village were also submitted with the revised plans in accordance with the requirements of this Department. These plans provide for a settling tank divided into two compartments having a total capacity sufficient to give about 11 hours' detention when serving a population of 60 persons, which is the basis of design used.

The supplementary treatment works provided for by the plans in connection with this settling tank is to consist of a subsurface irrigation field covering an area of about 0.16 acres. This area appears to be insufficient to provide for a proper supplementary treatment of the sewage to be contributed by the population for which the preliminary settling tank is designed but this is a matter that may be taken up whenever detailed plans are submitted.

In conclusion I would say that the plans for sewerage and sewage disposal for the village of Palatine Bridge have been revised and additional plans and data submitted in accordance with the requirements of the Department and I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge into the Mohawk river of effluent from the proposed sewage disposal plants; and that the permit contains in addition to the usual revocation and modification clauses the condition that whenever required by the State Commissioner of Health detailed plans for the supplementary treatment works as indicated by the plans now under consideration shall be submitted for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Palatine Bridge to discharge effluent from the sewage disposal plants to be constructed in connection with proposed sewer system for the village into the waters of the Mohawk river at the points shown by the plans within the municipality of Palatine Bridge in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable a
fication or change when in the judgment
Health such revocation, modification or ch

2. That the issuance of this permit shall
way action by this Department on any
be made for permission to discharge additic
waters of this State.

3. That both the sewer system and sew
plans approved this day shall be fully const
with such plans or approved amendments

4. That only sanitary or domestic sew
surface water from streets, roofs or other a
proposed sewers.

5. That no sewage sludge from any part
discharged into the Mohawk river or any o

6. That whenever required by the State C
factory detailed plans for the additional wo
ment of the entire sewage of the village a
plans approved this day shall be submitt
approval of said plans any or all portions c
mentary works for more complete treatme
structed and put in operation at such time
commissioner may designate.

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March 13, 1912

POCANTICO HILLS (St. Joseph's

Plans to serve the annex to the St. Joseph's N
Hills, Westchester county, were first submitted
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these plans inasmuch as no discharge of sewage or
watercourse was contemplated by them. The repc
of the plans follow.

ALBANY

EUGENE H. PORTER, M.D., *State Commissioner of He*

DEAR SIR: — I beg to submit the following repo
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lege at Pocantico Hills, Westchester county, which p
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Plans for sewage disposal for the Normal College co
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The plans now before the Department show that it i
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to the Normal College. It appears that this new buil
from 30 to 50 students. The plans, however, do not sho
of this building with reference to the main building
the location of the proposed disposal plant with refer

buildings, the existing disposal plant and any watercourse. Such a sketch plan drawn up approximately to scale, showing also the relative elevations of the different structures, should be submitted in order to facilitate the examination of plans.

From the plans and data submitted it appears that it is proposed to treat the sewage from the annex of the Normal College in a sewage disposal plant consisting of a settling tank and primary and secondary trickling filters. The settling tank which is to be circular in plan is divided into two compartments having a combined capacity of some 2,200 gallons and will give about 12 hours detention of sewage when serving the estimated population of the annex on the usual assumptions as to per capita rate of sewage contribution. From the settling tank the clarified effluent is to flow continuously through a 6-inch pipe to a trickling filter 8 feet by 16 feet in plan, which is to be filled to a depth of about 4 feet with gravel or broken stone, varying in size from 2 inches to 6 inches in diameter. The distribution system consists of tile pipe placed about two feet below the surface of the filter bed.

The outlet from the primary filter is to be located about 6 inches above the bottom of the bed and the effluent therefrom is to be discharged to the secondary filter, which is similar in construction to the primary filter except that it is to be provided with dry rubble masonry walls and bottom and will have no outlet.

According to the report of the designing engineer, the soil at the primary bed consists almost entirely of clay while the soil at the secondary bed is more porous and capable of absorbing moisture.

From our careful examination of the plans it appears that although the proposed settling tank if properly constructed would probably provide for a satisfactory means of preliminary treatment of the sewage, the proposed supplementary treatment works provided for by the plans would in all probability not satisfactorily care for the effluent from the settling tank. The proposed beds if constructed according to the plans would operate neither as sprinkling filters nor as contact beds.

It is usual to construct contact beds and sprinkling filters in the form of tanks of suitable size similar to those shown by the plans and filled to a depth of from 4 to 5 feet with coarse material such as gravel or broken stone. The application of sewage, however, differs in the two cases, with contact beds for small installations the sewage is uually delivered on to the beds until filled and is then allowed to stand in contact with the material for a period of from two to four hours. With sprinkling filters the sewage is applied in the form of spray through nozzles or by means of splash plates on to the material and the sewage allowed to percolate through the bed. The effluent is allowed to flow continuously from the bed.

If feasible it would seem proper to utilize for the method of sewage disposal at the annex the same method used to dispose of the sewage from the institution proper but if this method is not practicable and if contact beds or sprinkling filters must be used it will be necessary to provide further treatment of the effluent from such filters such as sand filters, subsurface irrigation or sterilization in view of the fact that the effluent must probably be discharged into a stream used as a source of public water supply.

I would, therefore, recommend that the plans be returned for further study with a view of revising them in accordance with the above suggestions, and that the designing engineer be advised to submit a general plan of the institution proper as suggested above.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *July 12, 1912.*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a re-examination of plans for sewage disposal to serve an annex of the St. Joseph's Normal College at Pocantico Hills, Westchester county. Revised plans were submitted to this Department on July 8, 1912, in accordance with the requirements expressed in a report of the Chief Engineer dated June 21, 1912.

The plant is situated south of the annex abou from a lake tributary to the Pocantico river whi able water supply. As in the plans previously the annex is received in a preliminary settling divided into two compartments by a baffle wall. nected by a double elbow pipe. This tank ha lons and will give about 12 hours' detention of mated population of the annex on the usual rate of sewage contribution. A sludge pipe drai structed as part of the contact beds. These bec "Adams Feeds" and have a total area of about of about 2,178,000 gallons per acre per day wi to per capita discharge of sewage, which is a r what should be designed for plants of this typ collects and discharges the effluent into siphon tact bed. Miller siphons discharge the sewag gate chamber, from which drains lead into a The bottom of these ditches is covered with 6 i a wooden trough supported on brick foundation clarified effluent from the contact beds flows fr near the bottom. A total of 160 feet of irriga on a grade of ½ inch in 40 feet. By means of t irrigation ditches may be rested.

In view of the fact that these plans have been sions shown as to make the examination difficul the rate of applying the sewage to the contact b ommend that these plans be returned to the desi I would also recommend that a system of subsur for the irrigation ditches shown by the plans p jointed tiling in this system with proper preli might not be made greater than 25 to 30 feet p of final disposal would be more satisfactory tha

Respectfully

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ALB

EUGENE H. PORTER, M.D., *State Commissioner o*

DEAR SIR: — I beg to submit the following re vised plans for sewage disposal to serve an anne lege at Pocantico Hills, Westchester county, whi this Department for approval on July 24, 1912.

The design at present submitted incorporates tion made in my previous report transmitted t 1912, namely, that "a system of subsurface irri irrigation ditches." The contact beds provided f July 8, 1912, however, have been eliminated an sedimentation in a circular settling tank divide before, followed by subsurface irrigation.

The effluent from the settling tank, which ta provide a detention of about 12 hours, is to flow about 30 feet from the tank. This dosing cham siphon of the Miller type by means of which th charged automatically into the distributing syst doses of about 360 gallons each. The plant is the small lake on the grounds.

The distributing system of the irrigation field two portions so arranged that either portion of time, is to consist of two main 6-inch distrib spaced 2 feet 6 inches apart on centers. Each la a total length of 1,800 feet, and provides for abo

The area covered by the irrigation field is equal to about 0.1 acres and would give a rate of operation of some 50,000 gallons per acre per day on the usual assumptions as to per capita rate of sewage contribution.

Although this rate of operation might have been permissible with the more complete preliminary treatment represented by the installation of the settling tank and contact beds provided for by the previous plans, the rate is excessive for subsurface irrigation systems constructed in a heavy compact soil, especially in view of the less complete preliminary treatment contemplated by the present plans. In order to get more satisfactory results either the lengths or the number of the laterals should be so increased as to give about 60 lineal feet of tiling per capita and they should be spaced not less than 4 feet apart on centers. Such an arrangement would require about 3,000 feet of tile pipe covering an area of about ¼ acre. This would give a rate of operation of about 18,000 gallons per acre per day when serving 50 persons contributing sewage at the usually assumed rate and should produce satisfactory results provided the proposed sewage disposal plant be properly constructed and operated with care and efficiency.

I would therefore recommend that the plans be approved on condition that the above recommendations be carried out.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

PORT CHESTER

Amended plans for sewers in sewer district No. 3 of the village of Port Chester were submitted for approval by the board of trustees on February 20, 1912. These plans were approved on February 26 but no permit was issued inasmuch as the plans did not provide for any additional discharge of sewage above that contemplated by the plans for sewers in District No. 3 approved in 1911. The report on the examination of the plans follows:

ALBANY, N. Y., *February* 21, 1912.

EUGENE H PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for amendments to the plans for sewers in district No. 3 in the village of Port Chester, Westchester county, submitted to this Department for approval by the board of trustees on February 20, 1912.

Plans for modifications and extensions to the sewers of this district were approved April 28, 1911, and provided for a 10-inch sewer to extend through private property from the intersection of Clinton and Sound View streets to Spring street. The plans now before the Department and under consideration show that it is proposed to abandon this sewer and to construct a 10-inch sewer on a slope of 2½ per cent. from a point near the intersection of Clinton and Sound View streets to Olivia street and the resolution of the board of trustees submitted in connection with the present plans state that the desired change is necessary in order to obtain, at a reasonable cost, the right of way for the proposed sewer through private property.

I would therefore recommend that the plans be approved. It will not be necessary, however, to issue a permit in connection with the approval of these plans inasmuch as they do not provide for any additional discharge of sewage above that contemplated by the plans for sewer extensions in district No. 3 approved in 1911, and in connection with which a permit was issued.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

POUGHKEEPS

Plans for proposed sewers in Columbia, A
streets and Bain avenue were submitted for ap
works of the city of Poughkeepsie on June
approved on July 17 and a permit was issued
ing the discharge into the Hudson river of s
proposed sewers on condition that detailed plan
liminary treatment of the entire sanitary sew
general plans for supplementary or more compl
submitted for approval on or before February

On November 26, 1912, plans for proposed se
road, Hinckley place and in Delafield, Morton, U
were approved. The permit issued in connecti
plans constituted an extension of the time for
the interception and treatment of the sewage
1913, to May 1, 1913. The permits and the re
the plans are given below.

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EUGENE H. PORTER, M.D., *State Commissioner* (

DEAR SIR: — I beg to submit the following
plans for sanitary sewer extensions in the ci
county, which were submitted to this Departme
of public works on June 27, 1912.

The plans provide for 12-inch sanitary se
Albany, Hoffman and Talmage streets and Bain
ing combined sewer system of the city. The
been carefully examined with respect to sizes, c
cleaning and inspection of the sewers, and it i
structed they should satisfactorily meet the nee
by them.

I am of the opinion that in connection with
consideration should be given at this time to the
of the sewage of the city not only with referen
protection of the city itself, which derives it
filtration from the Hudson river within a mile
outlets, but also in its effect upon municipali
keepsie. The obvious importance of providing
means of disposing of the sewage of the city
Hudson river was called to the attention of t
as January 3, 1907. At that time a copy of th
of the pollution of the Hudson river at and n
mitted to the mayor, and it was learned at tha
constructing an intercepting sewer to carry the se
site below the city for purification had already
practicable.

The question of the future disposal of the se
the Hudson river has, moreover, been given s
Department during the past few years and it ha
in connection with all future sewer construct
water supplies are involved, that consideration
posal or purification of sewage.

It appears, therefore, that it is important tha
make a comprehensive study of the problem of int
or dry weather flow of sewage of the city an
appropriate means of treating such sewage, and
for approval. The plans showing the means o
sewage should also outline a district in whic
should be on the separate plan. Such district s
areas north of the Fallkill, east of Cherry street

of the city, except in the cases of proposed sewer extensions in these restricted districts which will be tributary to the outlets discharging into the Hudson river and in which cases no probability exists that relief or overflow sewers to discharge into small streams would be necessary in the future.

I would therefore recommend that the plans for the proposed sewer extensions be approved and a permit be issued allowing the discharge into the Hudson river of sewage from these sewers on condition that detailed plans for the interception and preliminary treatment of the entire sanitary sewage of the city together with general plans for supplementary or more complete treatment of such sewage be submitted for approval on or before February 1, 1913.

I would further recommend that the permit contain the condition that a general plan be presented to accompany or form a part of the comprehensive plan for the interception of sanitary sewage which shall show the city divided appropriately into districts generally outlined above, upon which future sewer extensions upon the separate and upon the combined plan shall be designated.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to board of public works of city of Poughkeepsie to discharge sewage from the proposed sewer extensions in Columbia, Albany and other streets into the waters of the Hudson river through existing outfall sewers within the municipality of Poughkeepsie in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

4. That on or before February 1, 1913, satisfactory detailed plans for the interception and preliminary treatment of the sewage of the entire city, together with general plans for supplementary or more complete treatment of such sewage, shall be submitted to this Department for approval, and that after approval of said plans the intercepting sewers and the works for said preliminary treatment of sewage shown by said plans shall be constructed and put in operation whenever required by the State Commissioner of Health.

5. That a general plan shall be presented to accompany or form a part of the comprehensive plan for the interception of said sewage, as referred to under condition 4, above, which shall show the city divided appropriately into districts generally outlined in the accompanying report of the chief engineer, upon which shall be designated the districts in which future sewer extensions shall be constructed upon the separate and upon the combined plan.

July 17, 1912

ALEC H. SEYMOUR,
Acting State Commissioner of Health

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following r plans for proposed sanitary sewer extensions i Dutchess county, which were submitted to this the superintendent of public works on November

The plans show that it is proposed to construct

1. An 8-inch sewer in Delafield street runni street for a distance of 400 feet.
2. A 12-inch sewer in Morton street betwe avenue, a distance of 360 feet.
3. A 12-inch sewer in Denver place betwe Kelsey road, a distance of 470 feet.
4. A 12-inch sewer in Hinckley place betw Kelsey road, a distance of 674 feet.
5. A 12-inch sewer in Kelsey road between street, a distance of 940 feet.
6. A 12-inch sewer in Union, John and Wa from Pine street for a distance of about 1,6

These sewers are to be constructed with slopes self-cleansing velocities in them under ordinar are to be placed at the upper ends of the sewers of slope and alignment in order to facilitate clea

It is found from our careful examination of sewers if properly constructed should be adequat to satisfactorily care for the sanitary sewage o by them, and I would therefore recommend that a permit be issued allowing the discharge of sewa into the Hudson river through the existing outlet

Application is also made by the board of pub date of November 13, 1912, for permission to a sewer system at a point on Main street near G near the intersection of Mansion street and Ben one year. The superintendent of public works s tions and flooding of cellars is caused by sur during times of storm and that it is proposed streets next spring, at which time the surface removed from the sewers.

In view of the above and inasmuch as the pr receives considerable storm water I would recom mit allowing temporarily the admission of surfac systems at the points mentioned.

Application is also made by the board of p November 13, 1912, for the extension of the time the interception and preliminary treatment of th from February 1, 1913, to May 1, 1913. The July 12, 1912, required that such plans together plementary or more complete treatment of suc approval on or before February 1, 1913.

It has been set forth by the superintendent o munication with the Department that funds for drawing up the plans would not be available unti only one month for the preparation and filing of to be entirely inadequate on account of the mag also stated by the superintendent of public wor were presented that although the field work surv up the plans has been commenced it would be imp and have the plans ready for submission before

In view of the fact that the city has taken act with the permit granted by this Department a impracticable for the city to complete the pla would recommend that the extension of the perm

It appears, however, that the construction of the proposed sewers will materially increase the amount of sewage which is now being discharged into Saranac river and although it appears that no water supply is taken from the stream immediately below the outlets of these sewers it is very important that steps should be taken at an early date to restrict the pollution of this stream.

The question, moreover, of the future discharge of sewage from municipalities in this State is a very important matter and one that has been seriously considered by you during the past few years. It has been your consistent policy that in all future sewer construction in this State consideration should be given to the future disposal of sewage, especially where water supplies are involved. I am of the opinion that it is necessary for the village of Saranac Lake to make a comprehensive study at once and formulate a plan for the most practical means for the treatment of the entire sanitary sewage of the village and present the same to the Department for approval at an early date.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of sewage to be collected by the proposed sewers into Saranac river on condition that detailed plans for preliminary treatment of the entire sanitary sewage of the village together with general plans for supplementary or more complete treatment of such sewage be submitted for approval to this Department on or before March 1, 1913.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of Saranac Lake to discharge sewage from the proposed sewer extensions in Flower avenue, Lake avenue, and other streets into the waters of Saranac river through existing outlet sewers within the municipality of Saranac Lake in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

4. That on or before March 1, 1913, satisfactory detailed plans for preliminary purification or clarification by sedimentation of the entire sanitary sewage of the village of Saranac Lake, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage, shall be submitted to this Department for approval; and that after approval of said plans such works for preliminary purification of such sewage shall be constructed and put in operation within the time limit then specified.

EUGENE H. PORTER,
State Commissioner of Health

June 20, 1912

from the proposed sewers on condition that pla
village be submitted to this Department for a]
1913. The permit and report on the examinati

ALI

EUGENE H. PORTER, M.D., *State Commissioner c*

DEAR SIR: — I beg to submit the following
plans for proposed sewer extensions in the villa;
to this Department for approval by the board o

Plans for the original sewer system for the v
approved by the then State Board of Health on
that this system was partially completed but ow
was unsatisfactory and inefficient and plans for
portions of the old system as were available, wei
1898. Plans for minor extensions to this system
1900, December 9, 1903, and on September 6, 1!
1900 provided for a sewage disposal plant to trea
of the village to be constructed whenever found
never constructed.

It appears from the plans now before the Depa
tion, and from the report of the designing eng
recently annexed some 250 acres of land southea
and owing to the insanitary conditions which have
lack of sewerage facilities in this new section it
existing sewer system to cover these areas.

The plans for the new district to the southeast
is proposed to construct sewers in Flower avenue,
street and to convey the sewage to be collected by
ing station to be located at the intersection of F
street. No details of this plant are submitted, how
report of the designing engineer the pumping stati
a centrifugal pump to be driven by an electric motc

The new section west of the old village line is tc
tributary to the existing sewers in Lake avenue an
sewer. These sewers are to vary in size from 6 to
are for the most part to be constructed on minimum
stoppage of the proposed sewers should be experie
they be properly constructed and maintained. Manh
constructed at all points of change of slope and alig
tate inspection and cleaning. The plans also prov
short sewer extension in Wayotah road tributary t
Maple street.

Approval of the proposition to make the followin
system is also requested;

1. To change the size of 4,100 feet of the 8-inc
outlet sewer from Maple street shown by the pla
12 inches in diameter.

2. To increase the size of the 6-inch sewer in
upper end of the Maple street outlet sewer to 8 i

3. To change the size of the sewer designated
Line A from station 1+12 to 8+75 from 8 inch
change the slope of this portion of the sewer fro
per cent. According to the report of the desig
posed changes are necessary in order to provide a
these sewers which will serve recent and future
poration. I would recommend that the approval o
be given.

From our careful examination of the plans it appe
sewers should be adequate as to size and capacity
for the sanitary sewage of the sections to be served b
in the construction these sewers be made sufficiently w
excessive infiltration of ground water.

It appears, however, that the construction of the proposed sewers will materially increase the amount of sewage which is now being discharged into Saranac river and although it appears that no water supply is taken from the stream immediately below the outlets of these sewers it is very important that steps should be taken at an early date to restrict the pollution of this stream.

The question, moreover, of the future discharge of sewage from municipalities in this State is a very important matter and one that has been seriously considered by you during the past few years. It has been your consistent policy that in all future sewer construction in this State consideration should be given to the future disposal of sewage, especially where water supplies are involved. I am of the opinion that it is necessary for the village of Saranac Lake to make a comprehensive study at once and formulate a plan for the most practical means for the treatment of the entire sanitary sewage of the village and present the same to the Department for approval at an early date.

I would, therefore, recommend that the plans be approved and a permit be issued allowing the discharge of sewage to be collected by the proposed sewers into Saranac river on condition that detailed plans for preliminary treatment of the entire sanitary sewage of the village together with general plans for supplementary or more complete treatment of such sewage be submitted for approval to this Department on or before March 1, 1913.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of Saranac Lake to discharge sewage from the proposed sewer extensions in Flower avenue, Lake avenue, and other streets into the waters of Saranac river through existing outlet sewers within the municipality of Saranac Lake in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

4. That on or before March 1, 1913, satisfactory detailed plans for preliminary purification or clarification by sedimentation of the entire sanitary sewage of the village of Saranac Lake, accompanied by general plans for additional or supplementary works for more complete treatment of the sewage, shall be submitted to this Department for approval; and that after approval of said plans such works for preliminary purification of such sewage shall be constructed and put in operation within the time limit then specified.

EUGENE H. PORTER,
State Commissioner of Health

June 20, 1912

It would seem advisable, and in fact, necessary, that the settling tanks be so constructed as to make possible the removal of this scum at more or less frequent intervals. This may be done by omitting the concrete arch roof and providing a plank covering to the tank or by inserting manholes along the side walls at several points. It is customary to provide scum pipes leading to the sludge beds in order that the scum may be easily and frequently removed.

From our careful examination of the plans it appears that the sewer system if modified in accordance with the suggestions embodied in this report and properly constructed should satisfactorily care for the sanitary sewage of the village for a considerable period in the future and the sewage disposal plant, if properly constructed and operated, should produce a satisfactory, effluent. The plans however are not in satisfactory shape for a final approval and I would, therefore, recommend that they be returned to the village authorities with the recommendation that they be modified in the following respects:

(1) The design of the inverted siphons should be modified so as to provide for double tubes having diameters less than the sewer on either side and so arranged that one tube may be operated at a time.

(2) It also appears that the sizes of the majority of the sewers comprising the system could safely be reduced.

(3) The site for the disposal plant is evidently not the most favorable one and the plant should not be located at the point indicated unless it can be shown that no other site at some considerable distance from streets or highways is available.

(4) The plan of the settling tanks should be so revised that opportunity may be afforded when the plant is constructed to readily remove the scum, which will form on the surface of the sewage in the tank between side walls and the settling compartment partitions.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, *March* 4, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to make the following report on a re-examination of plans for sewerage and sewage disposal for the village of Springville, Erie county.

These plans were first submitted by the village trustees on February 13, 1912, and were returned to the designing engineer for correction on February 26 in the following particulars:

(1) The design of the inverted siphons, it being suggested that two pipes be arranged for instead of one at each stream crossing.

(2) As to the diameters of the lateral sewers, it being recommended that 8-inch sewers be laid instead of 10-inch sewers.

(3) As to the site of the disposal plant, it was recommended that the plant be located at a point further removed from streets and highways and at such location as to serve a greater area within the village limits by gravity flow to the plant.

(4) In the design of the settling tank, it being recommended that plank cover for the tank be provided or that manholes be placed along the sides of the tank to admit of convenient removal of scum which will form between the outside walls of the tank and the settling compartment partitions.

These plans were returned on February 23 and the changes as recommended in my former report dated February 26 and as noted above have been made in the plans.

The plans, however, show two alternate sites for the location of the disposal plant and the designing engineer suggests that an inspection of the local conditions be made before either site is settled upon. I beg to recommend, however, that in view of the obvious advantages of the alternate site near the intersection of the two streams in the village over the site as first

be made sufficiently tight to prevent excessive infiltration of ground water. This is especially true of the 10-inch sewers which with one or two possible exceptions could be changed in size to 8-inch sewers.

It is proposed to carry the sewage under the creek, which flows through the village, at three points, by means of inverted siphons consisting of single tubes of cast-iron pipe having the same diameter as the section of the sewers above and below the stream crossings. It would appear that more satisfactory results would be obtained and there would be less liability of clogging if two pipes of smaller diameter than the sewers on either side of the siphons were substituted for the single pipe of the same diameter. These pipes should be so arranged that one of them may be operated at a time in order that self-cleansing velocities may be obtained in the siphon, especially during the early life of the system when the contribution of sewage will probably be comparatively small at these points.

It is proposed to treat the sewage collected by the proposed sewer system in a sewage disposal plant to be located near the small stream tributary to Cattaraugus creek which flows through the village in a southerly direction. This stream which rises a short distance north of the village has a drainage area above this point of only 3 or 4 square miles.

The proposed site for the sewage disposal works does not appear to be in the most favorable location inasmuch as it is situated within 300 feet of Mill street which appears to be one of the principal streets in the village. The plant should be located, if possible, at a point more remote from the developed portions of the village and it appears that a more favorable site for the plant would be near or at the junction of the two streams which flow through the village between Mill street and Waverly street where it would be less liable to create a nuisance. Moreover, the change in location of the plant would increase the extent of territory from which sewage might be delivered by gravity to the disposal plant. The increased cost involved in such change in location might be offset by decreasing the size of the lateral sewers.

The proposed sewage disposal plant is to consist of two settling tanks of the Imhoff or Emscher type, 4 contact beds and an auxiliary sludge bed for the disposal of sludge. Provisions are made on the plans for future extensions of the disposal works by adding additional settling tanks and contact beds units.

The sewage upon reaching the disposal plant is to be discharged into a distributing gallery extending along the upper ends of the settling tanks from which it can be discharged into either or both of the tanks after passing through screens.

The settling tanks are divided by means of partition walls into an upper or settling compartment and a lower or sludge compartment for the storage and decomposition of sludge. The capacity of the settling compartments of the two tanks is sufficient on the usual assumptions as to per capita rate of sewage contribution to provide for about 3½ hours' detention of sewage when serving the present population.

The sludge compartments comprise a series of hoppers which have a total capacity of about 37 per cent. of the tanks. Sludge pipes are to be connected with the low points of these hoppers and so arranged that the sludge may be drawn off and discharged by gravity flow to an adjacent sludge bed without emptying the tanks. This bed which is 40 feet by 33 feet is to be provided with a filtering material consisting of 12 inches of gravel underlying a layer of sand 3 inches deep. The underdrains of the sludge bed which consists of 3-inch tiles are to discharge into a stream near the disposal works.

The settled effluent from the settling tanks is to be further treated on 4 contact beds having a total area of 0.8 of an acre. These beds, which will be required to operate at the rate of about 375,000 gallons per acre when serving the present population, are to be filled with broken stone to a depth of five feet.

Respecting the design of the settling tank as affecting the operation of the plant, it should be noted that no opportunity will be afforded for the removal of scum which will form on the surface of the sewage in the tank outside the settling compartment, if the tank is constructed in accordance with the plans.

It would seem advisable, and in fact, necessar so constructed as to make possible the removal frequent intervals. This may be done by omitti providing a plank covering to the tank or by side walls at several points. It is customary t to the sludge beds in order that the scum may moved.

From our careful examination of the plans it a if modified in accordance with the suggestions properly constructed should satisfactorily care the village for a considerable period in the fut plant, if properly constructed and operated, sh effluent. The plans however are not in satisfacto and I would, therefore, recommend that they authorities with the recommendation that they respects:

(1) The design of the inverted siphons provide for double tubes having diameters l side and so arranged that one tube may be

(2) It also appears that the sizes of the prising the system could safely be reduced.

(3) The site for the disposal plant is evi one and the plant should not be located at can be shown that no other site at some streets or highways is available.

(4) The plan of the settling tanks shou tunity may be afforded when the plant is c the scum, which will form on the surface between side walls and the settling compart

Respectful

T

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to make the following re plans for sewerage and sewage disposal for the county.

These plans were first submitted by the villa 1912, and were returned to the designing enginee 26 in the following particulars:

(1) The design of the inverted siphons, pipes be arranged for instead of one at each

(2) As to the diameters of the lateral se that 8-inch sewers be laid instead of 10-inch

(3) As to the site of the disposal plant, i plant be located at a point further removed and at such location as to serve a greater a by gravity flow to the plant.

(4) In the design of the settling tank, plank cover for the tank be provided or tha the sides of the tank to admit of convenient form between the outside walls of the tank ment partitions.

These plans were returned on February 28 a nended in my former report dated February 26 been made in the plans.

The plans, however, show two alternate sites posal plant and the designing engineer suggests local conditions be made before either site is sett mend, however, that in view of the obvious adva near the intersection of the two streams in the v

proposed for the disposal plant, the permit issued to require the construction of the plant at the point shown below the intersection of these streams since the engineer states that the construction of the plant at this point is practicable. It would seem that an inspection of conditions in the village was not necessary and, owing to the limited force in this Division, is not advisable under the circumstances.

I beg to recommend, therefore, that the plans be approved and that a permit be issued allowing the discharge into a tributary of Cattaraugus creek of effluent from the proposed sewage disposal plant.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of trustees of the village of Springville to discharge effluent from the sewage disposal plant to be constructed in connection with the proposed sewer system for the village of Springville into the waters of a tributary of Cattaraugus creek at a point shown by plans within the municipality of Springville in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.

5. That no sewage sludge from any part of the disposal works shall be discharged into the tributary of Cattaraugus creek or any other water course.

6. That the size of the proposed sewer in Woodward avenue between Central avenue and Buffalo street and of the proposed sewer through private property between Franklin and Main streets shall be increased to 10 inches in diameter or that the slopes of these sewers shall be increased to not less than 0.3 per cent.

7. That the sewage disposal works shall be constructed at the site marked on the plans "alternate location of tank" instead of at the site near White street as shown by the plans when first submitted for approval.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

March 4, 1912

THROGS NECK (St. Joseph's Institute)

Plans for sewage disposal for St. Joseph's Institute for the Improved Instruction of Deaf Mutes at Throgs Neck were submitted for approval on August 5, 1912. These plans were approved on August 14, and a permit was issued to the Institution on the same date allowing the discharge into Westchester creek of effluent from the proposed sewage disposal plant consisting of screen chamber, settling tank, sprinkling filter and final settling basin. The permit and report on the examination of the plans follow:

ALBANY,

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to submit the following repo plans for sewage disposal for St. Joseph's Institute tion of Deaf Mutes, at Throgs Neck, in the Boro city, which plans were submitted to this Departmen 5, 1912.

The plans were prepared by Waring, Chapman neers of New York city, and comprise tracings and ing plans:

1. General plan of sewerage system showing disposal plant.
2. Details of settling tank and pump house.
3. Details of sprinkling filter.
4. Profile of force main and filter.

According to the report of the designing engine an area of about 55 acres on Throgs Neck, locate Westchester creek. One public highway extends t other streets have been located by New York city constructed in the future.

The proposed disposal plant is to temporarily ca dormitory of the Institution having an average pop the sewers from this building have been so plann nected with the public sewers when constructed.

The disposal works are to consist of a screen sprinkling filter and final settling basin and the works is to be discharged into Westchester creek, river and Long Island sound.

The sewage upon reaching the disposal plant v inclined bar screen with bars spaced ⅝-inch apart i metal shelf is to be placed above this screen in ord screens and handling the screenings. Directly bel be placed a removable galvanized wire mesh scree

After passing through these screens the sewage rectangular sedimentation tank 13 feet by 10 feet by two compartments by means of a longitudinal pa partments are connected in series and have a total when filled to a depth of 5 feet.

The sedimentation tank is to be operated as an i when filled will be drawn down by pumping to witl or a distance of 3 feet. This will provide for an a of the sewage of about 3 hours when serving 260 p at the usually assumed rate.

The pump house is to be located adjacent to the tank and is to contain a dry well in which is to be pump. This pump is to be driven by a direct con trolled by an automatic device for starting and st discharge the clarified effluent from the settling ta ing system of the sprinkling filter through a 4-i some 1,600 feet long.

The proposed filter is to be constructed above gr made of 2-inch by 6-inch planks with 2-inch vertica this crib which is to be provided with a false bo to be filled to a depth of about 6 feet with broken be applied to the surface of the filter by means of according to the plans, will operate under a mini 10 feet.

The effluent from the sprinkling filter, accordin of the engineers, is to be passed through a sedime tention period of about 2 hours before it is disch tributary to Westchester creek some 500 feet from

From our careful examination of the plans it would appear that the proposed sewage disposal works if properly constructed and operated with care and efficiency should produce an effluent which may be safely discharged into Westchester creek at present without objection, especially in view of the fact that there are no public water supplies involved.

I would therefore recommend that the plans be approved and a permit be issued to the Institution authorities allowing the discharge into Westchester creek of effluent from the proposed sewage disposal works.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to St. Joseph's Institute for the Improved Instruction of Deaf Mutes to discharge effluent from the proposed sewage disposal plant to treat the sewage from the dormitory at said Institution into the waters of Westchester creek near the Institution within the municipality of New York city in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.
4. That only sanitary or domestic sewage, and no storm water or surface water from streets, roofs or other areas shall be admitted to the proposed sewers.
5. That no sewage sludge from any part of the disposal works shall be discharged into Westchester creek or any other watercourse or body of water.
6. That the amount of sewage to be passed through the proposed sewage disposal plant shall be limited to that contributed by 300 persons.

EUGENE H. PORTER,
August 14, 1912 *State Commissioner of Health*

TOMPKINS COUNTY TUBERCULOSIS HOSPITAL

Plans for sewage disposal for the Tompkins County Tuberculosis Hospital were submitted for approval on October 4, 1912, but were returned for additions and revisions with reference to the subsurface irrigation system on October 7, 1912. Plans revised in accordance with recommendations of the Department were resubmitted for approval on October 21, 1912, and were approved on October 30. The permit issued in connection with the approval of these plans allows the discharge into a tributary of Cayuga lake of effluent from the proposed sewage disposal plant consisting of a septic tank, dosing chamber and subsurface irrigation system.

ALBANY, *October 25*, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of sewage disposal for the Tompkins County Tuberculosis Hospital at Taughannock Falls.

The plans were first submitted on Octobe
attorney, Ithaca, N. Y., but were returned
October 7 because of the fact that no plar
system, indicated in general on the plans, w

The plans were resubmitted on October 21
designer, Prof. Howard W. Riley of Cornell
and giving data relative to the stream int
the irrigation field are to discharge.

The proposed hospital is to be located i
Tompkins county about one mile west of (
Falls. The plans for this hospital have been
is to accommodate fifty persons and the sev
disposal plant to be located southerly from t

The plans show that it is proposed to const
ing a capacity of about 2,800 gallons and]
submerged outlet, inlet and outlet baffles and
sludge in the section of the tank near the
valves leading to the sludge bed to the west (

The effluent from the septic tank is to be le
is to be constructed alongside the septic tar
5-inch Miller siphon. From the siphon chan
leads to a diverting manhole from which two l
effluent from the tank to the subsurface irrig
into two portions.

The subsurface irrigation tiling system con
of 3-inch agricultural tile laid with a slope of :
of 1 4/10 feet below the ground surface. The
ing are to be placed 9 feet apart and between
drain tiles are to be laid at a depth below
greater than the depth of the distributing ti
charge into a collecting drain which encloses tw
in turn discharge into an outlet drain which
irrigation field to a small stream having outl
miles northwesterly from the head of the lak

It appears from our careful examination of
properly constructed and operated, should serve
intended. The capacity of the septic tank is
36 hours detention of sewage, depending on the
whether 36 gallons per capita per day estimated
or 75 gallons per capita per day which may at
reached.

The capacity of the siphon tank is sufficient t
surface irrigation system and the length of the
gation system amounts to 100 feet per person
The area of the irrigation field is one acre whi
100 gallons per capita per day is made for the s
hospital, would result in only 5,000 gallons pe
of operation of the irrigation field. It is stated
is gravelly clay and that the field is to be kept

Provision has been made in the plans for inte
water before reaching the subsurface irrigation

As noted above, the seepage which may occur
to be collected by the underdrain system and w
point seven miles northwesterly from Ithaca, whe
after treatment in septic tanks, is discharged.
this Department the only public water supply de
that of the village of Seneca Falls, the intake be
and about 38 miles northwesterly from Ithaca a
from the mouth of the stream which will recei
irrigation field at the Tompkins County Tubercul

In view of the above I beg to recommend that the plans be approved and a permit be issued allowing the discharge of effluent from the irrigation field or disposal plant into a tributary of Cayuga lake.

I would further recommend that in addition to the usual provisions relative to revocation and modification in the permit that further provisions be included which shall provide that whenever deemed necessary in the future by the State Commissioner of Health additional works or other means for treating the sewage from the hospital shall be constructed in accordance with plans satisfactory to this Department.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 76 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of managers of the Tompkins County Tuberculosis Hospital to discharge effluent from the sewage disposal plant to be constructed at Tompkins County Tuberculosis Hospital into the waters of a tributary of Cayuga lake near Taughannock Falls within the town of Ulysses in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.

2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this state.

3. That both the sewer system and the sewage disposal works shown by plans approved this day shall be fully constructed in complete conformity with such plans or approved amendments thereof.

4. That only sanitary or domestic sewage and no storm water or surface water from grounds, roofs or other areas shall be admitted to the proposed sewers and sewage disposal works.

5. That no sewage sludge from any part of the disposal works shall be discharged into Lake Cayuga or any other watercourse or body of water.

6. That whenever required by the State Commissioner of Health, satisfactory detailed plans for additional or for other works for more complete treatment of the sewage from the Tompkins County Tuberculosis Hospital shall be submitted for approval; and after approval of said plans any or all portions of such additional or such other works for more complete treatment of sewage shall be constructed and put in operation at such time or times thereafter as said Commissioner may designate.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

October 30, 1912

TROY

On April 17, 1912, application was made by the city authorities for the approval of plans for a proposed sewer in Tenth street, in the city of Troy. The plans were approved on April 23 and a permit was issued to the city on the same date allowing the discharge into the Hudson river, of sewage from the proposed sewer on condition that plans for the interception and treatment of the entire sanitary sewage of the city be submitted for approval on or before January 1, 1913.

Plans for proposed sanitary sewers in Willis
were approved on August 13, 1912. The permit iss
approval of these latter plans is similar to the
authorities on April 23, 1912.

ALBA

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following rep
plans for proposed combined sewer extensions in t
to this Department for approval by the common co
A single copy of the plans was first submitted o
and a duplicate copy was received on April 7. Ap
asking for the approval of the plans, was not recei
owing to a misunderstanding on the part of the
requirements of the Department.

The plans show that it is proposed to construct co
street, between Hoosic street and Avenue B. The pro
to vary in size from 8 to 30 inches in diameter, are w
where it is proposed to construct sewers on the combi
with the general sewer plan of the city filed with this
30, 1911.

The plans have been carefully examined and they ap
from a hydraulic standpoint as far as capacities, sel
other provisions necessary for a combined sewer are co
has been made, however, to determine closely how f
capacities will be sufficient for future growth of the se
them. It is quite probable that no difficulty will be expe
of years in regard to capacities for storm waters and es
the contribution of sanitary sewage which would be smal
storm water provisions necessary for sewers of this typ

I would therefore recommend that the plans be appro
issued allowing the discharge into the Hudson river thr
sewers of sewage from the proposed sewers and that th
addition to the usual revocation and modification clauses
relating to the submission of plans for intercepting sew
posal works as are contained in the permit issued to the
the city of Troy under date of October 17, 1911, for the d
from proposed sewers in Burdette avenue, Sage avenue,
other streets.

Respectfully submitt
THEODORE

PERMIT

Application having been duly made to the State Commiss
as provided by section 77 of chapter 49 of the Laws of 1
Health Law," as amended by chapter 553 of the Laws of 19
chapter 45 of the Consolidated Laws, permission is hereby gi
mon council of the city of Troy to discharge sewage from the
extensions in Tenth street into the waters of the Hudson riv
existing outfall sewers within the municipality of Troy in a
the plans accompanying the petition, under the following con

1. That this permit shall be revocable at any time or su
fication or change when in the judgment of the State Con
Health such revocation, modification or change shall become
2. That the issuance of this permit shall not be deemed to
way action by this Department on any future applicatio
be made for permission to discharge additional sewage or efflu
waters of this State.

3. That on or before January 1, 1913, the city of Troy shall submit to this Department for approval satisfactory detailed plans, in general accordance with the preliminary plan submitted to this Department by the city authorities on September 30, 1911, showing a comprehensive system of intercepting and outfall sewers to convey to a suitable site for sewage disposal works the entire sanitary sewage of the city of Troy collected by separate sanitary sewers and the entire dry weather flow of sanitary sewage of said city collected by the combined sewers, together with detailed plans showing works for partial treatment or clarification of such sewage and general plans for additional works for more complete treatment of sewage.

4. That upon approval of said plans, and when required by the State Commissioner of Health, said intercepting and outfall sewers and said works for partial treatment of clarification of sewage shall be constructed and put in operation within a time limit which may be then specified.

5. That whenever required by the State Commissioner of Health, satisfactory detailed plans for additional works for more complete treatment of the entire sanitary sewage of the city shall be submitted for approval and upon approval of said plans any or all portions of such additional or supplementary works for more complete treatment of sewage shall be constructed and put into operation at such time or times thereafter as said Commissioner may designate.

EUGENE H. PORTER,
State Commissioner of Health

April 23, 1912

ALBANY, *August* 12, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sanitary sewer extensions in the city of Troy, Rensselaer county, which were submitted to this Department for approval by the common council on August 5, 1912.

The plans show that it is proposed to construct sanitary sewers in Lincoln avenue and Willis street. Plans for a combined sewer in Lincoln avenue were first submitted for approval on June 3, 1912, and from a preliminary examination of them by the Engineering Division it is found that the proposed sewer was located in the district within which, according to the general sewer plan of the city presented to this Department in September, 1911, it was the intention to have sewers constructed on the separate plan and not on the combined plan. The city authorities were advised of this fact in a letter addressed to the deputy city engineer on June 17, 1912, and that there appeared to be no adequate reason presented why the proposed sewer should not be constructed on the separate plan in accordance with the general plan accepted by this Department last year. The plans were accordingly returned to the city engineer at a conference which was held in this office in reference to the proposed sewer on July 25, 1912, at which time it was agreed that the plans would be revised in accordance with the requirements of this Department.

The revised plans for the proposed sewer in Lincoln avenue now before the Department and under consideration show that it is proposed to construct an 8-inch sanitary sewer in Lincoln avenue from Delaware avenue to Fourth street, a distance of about 1,900 feet. This sewer is to be constructed with a slope of from 5 per cent. to 14.08 per cent. and is tributary to the existing combined sewer in Fourth street.

The plans for the proposed sanitary sewer in Willis street show that this sewer is also in the district within which sewers are to be constructed on the separate plan. It is to be 8 inches in diameter and is to extend from a point near the southerly city line to Campbell's Highway, a distance of 760 feet. This sewer is to be constructed with slopes varying from 3.3 per cent. to 9.36 per cent. and is to be tributary to the existing sewer in Campbell's Highway, which in turn discharges into the Hudson river through the Mill street outlet sewer near the mouth of the Wynantskill.

From our careful examination of the plans it is sewers if properly constructed should be adequate as satisfactorily care for the sanitary sewage of the them.

I would therefore recommend that the plans be a issued and that the permit contain in addition to modification clauses the condition that plans for th ment of the entire sanitary sewage of the city be s ment by January 1, 1913, in accordance with the peri council of the city of Troy under date of October 17,

Respectfully subr
THEO

These plans were approved on August 13, 1912, an the city authorities in connection with the approval of permit granted to the city on April 23, 1912.

TUCKAHOE

On August 17, 1912, application was made by the boar village of Tuckahoe for the approval of plans for propose and Pleasant avenues, Wallace and Chestnut streets and in plans were approved on August 24 and a permit was iss authorities on the same date, allowing the discharge, into of sewage from the proposed sewers after such sewage sha passed through the village sewage disposal plant. The pern on the examination of the plans follow:

ALBANY, N. Y., A

EUGENE H. PORTER, M.D., *State Commissioner of Health, All*

DEAR SIR: — I beg to submit the following report on an plans for proposed sanitary sewer extensions in the village of chester county, which were submitted to this Department for board of trustees on August 17, 1912.

The plans show that it is proposed to construct sewers in Cir ant avenues and in Wallace and Chestnut streets and in Circ northern section of the village. These sewers, which cover an 13 acres, are tributary to the existing sewer system and sewage

The proposed sewers are to consist of 8-inch vitrified tile to be constructed with slopes sufficiently steep to produce self-cle ities under ordinary conditions. Manholes are to be placed at change of slope, and alignment and flush tanks are to be inst upper ends of lateral sewers in order to facilitate cleaning and f

From our careful examination of the plans it is found that t sewers if properly constructed should be adequate as to sizes and to satisfactorily care for the sanitary sewage of the section to be them.

I would therefore recommend that the plans be approved and t mit be issued allowing the discharge of sewage from the proposed s the Bronx river after such sewage shall first have been passed th village sewage disposal plant.

Respectfully submitted,
THEODORE HORTO
Chief En

PERMIT

Application having been duly made to the State Commissioner of as provided by section 77 of chapter 49 of the Laws of 1909, the " Health Law," as amended by chapter 553 of the Laws of 1911, consti

chapter [illegible] of the consolidated laws [illegible]
to trustees of the [illegible]
sewer extensions [illegible]
waters of the Bronx river through the [illegible]
ipality of Bronxville, in accordance with the plans [illegible]
under the following conditions:

1. That this permit shall be revocable at any time [illegible]
fication or change when in the judgment of the [illegible]
Health such revocation, modification or change [illegible]

2. That the issuance of this permit shall [illegible]
any way action by this Department on any future [illegible]
be made for permission to discharge additional [illegible]
the waters of this State.

3. That only sanitary or domestic [illegible]
face water from streets, roofs [illegible]
proposed sewers.

4. That no [illegible]
[illegible]

The area of the sprinkling filters which are divided in1 arranged that either portion may be temporarily thrown thousandths of an acre, which would give a rate of opera gallons per acre per day.

The subsurface irrigation area comprises one-half acre tiling.

It appears that the plant as designed will properly care be treated, and that if it is found that the water consumpt tion is less than 100 gallons per capital, as intimated in th signing engineer, an increase in the number of persons might not require an increase in the capacity of the Imh other hand, the rate of operation of the sprinkling filter though the sewage contribution was found to be less than capita daily, is such that with a considerable increase in t the seminary additional area sprinkling filters will be requi

The plant is sufficiently large, however, to adequately se intended and satisfactory results may be obtained with a s the population of the seminary.

In view of the fact that no discharge of sewage effluent in is contemplated under the design, it would not seem necessary mit in connection with the approval of these plans.

In view of the above, I beg to recommend that the plans b

Respectfully submitte

THEODORE H

Ch

VALATIE (State Reformatory for Wome

On December 3, 1912, application was made by the State Arc approval of plans for the sewage disposal plant to be installe cottages under construction at the State Reformatory for Wome The plans were approved on December 9, 1912. The report on tion of the plans is given below.

Decembe

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany,*

DEAR SIR: — I beg to submit the following report on an exa plans for proposed temporary water supply and sewage disposal be installed for two cottages now being completed at the State Women at Valatie, which plans were submitted to this Depa approval by the State Architect on December 3, 1912.

According to the report of the State Architect accompanying the proposed systems are to be used simply as a temporary expedien two cottages will eventually be connected with the water supply a disposal systems to be constructed for the whole institution.

The two cottages will contain about 50 inmates and it is estim the average per capita water consumption will amount to from gallons per day. The water supply is to be derived from two 1¼-i which have been driven to a water bearing strata some 16 feet b surface of the ground and the water is to be handled by two inside systems which will have a pumping capacity of 900 gallons per ho storage capacity of 750 gallons under maximum pressure.

The sewage from the two buildings will be collected by means of sewer to be laid on a slope of 0.6 per cent. which will discharge int wall leaching cesspool located about 400 feet from the nearest building cesspool, which is circular in plan, 6 feet in diameter and about 5 fe below the flow line, will have sufficient capacity to give about 10 hours tion when serving the proposed population even though no leaching occur.

The overflow from the cesspools is to be discharged into two lines of 4-inch subsurface tiling which are to terminate in 2 gravel beds, each of which is to be 25 feet square. The total length of the subsurface tiling is about 200 feet and the effluent which is not taken care by these tiles will be discharged onto the two gravel beds. These beds will have an embankment around them to prevent overflowing or flooding. The piping is so arranged that either or both of the gravel beds may be operated at a time.

From our careful examination of the plans it would appear that the proposed water supply and sewage disposal systems should satisfactorily meet the temporary needs of the two buildings, and I would therefore recommend that the plans be approved as a temporary expedient and with the understanding that the two cottages will be connected with the water supply and sewage disposal systems to be developed for the whole institution. Plans for such general systems should, of course, be submitted to this Department for approval before their construction is undertaken.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

WATERTOWN

During the past year plans for proposed sewers in the streets listed below have been approved and permits, containing the usual revocation and modification clauses, have been issued to the city authorities in connection with the approval with such plans:

Date of approval	Location of sewer	Stream receiving sewage
Feb. 26.	Highland avenue, Betts and Anne streets	Black river
May 6.	Lillian street	Black river
June 6.	Tilden street	Black river
June 29.	Massey street and extension to western outfall sanitary trunk sewer	Black river

In addition to the above, plans for a proposed sanitary trunk sewer in the northern section of the city were submitted for approval by the board of public works on April 10, 1912. These plans were approved on April 17, 1912, and a permit was granted to the city authorities on the same date allowing the discharge into the Black river of sewage from the proposed sewer on condition that whenever required by the State Commissioner of Health plans for the separation, interception and treatment of the sanitary sewage of the city shall be submitted for approval. The permit issued in connection with the approval of these plans and the report on the examination of them follow.

ALBANY, N. Y., *April* 17, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed sanitary trunk sewer in the northern section of the city of Watertown, Jefferson county, which plans were submitted to this Department for approval by the board of public works on April 10, 1912.

The territory to be served by the proposed sewer, according to the report of the designing engineer, comprises an area of about 1,300 acres, of which some 600 acres are within the city limits. It is estimated that the present population of this section is about 1,200 and that an ultimate future population of 39,000 will obtain in the proposed sewer district which is the basis of design used. Except for a few private sewers which are to be intercepted by the proposed sewer there are no sewerage facilities in this territory.

The proposed sewer, to be known as the north side sanitary trunk sewer, varies in size from 12 to 45 inches in diameter and is to be constructed largely through private right of way along the course of a small stream

which flows through the sewer district in a westerly direction. The trunk sewer is to extend from the intersection of Henry street and Starbuck avenue to the Black river near the mouth of Cowen's creek, a distance of some 9,585 feet, and is to intercept the Cooper street outlet sewer, which serves a considerable area between the Black river and the proposed sewer district and discharges into Cowen's creek some 186 feet from the river.

The plans have been carefully examined with reference to alignment, sizes, grades, capacities, facilities for cleaning and inspection and flushing and other features of an hydraulic or sanitary nature in connection with the proposed sewer and it is found that the trunk sewer if properly constructed should satisfactorily care for the sanitary sewage of the district to be served by it. In fact the design provides for a somewhat higher rate of flow than is usual for sanitary sewers. It would appear, however, that the proposed sewer is not excessively large in view of the high per capita rate of water consumption in the city.

I would therefore recommend that the plans be approved and a permit be issued allowing the discharge of sewage from the proposed sewer into the Black river near the mouth of Cowen's creek and that the permit contain in addition to the usual revocation and modification clauses the condition that plans for the lateral sewers and for sewer extensions to the proposed trunk sewer shall be submitted to this Department for approval before any such sewers are constructed.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the board of public works of the city of Watertown to discharge sewage from the proposed north side sanitary trunk sewer into the waters of Black river near the mouth of Cowen's creek within the municipality of Watertown in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.
3. That the above sewer shall be constructed in full conformity with the plans as approved and that no laterals or extensions discharging into said sewer shall be constructed until plans for the same shall have been approved by this Department.
4. That only sanitary or domestic sewage, and no storm water from streets, roofs or other areas shall be admitted to the proposed sewer.
5. That whenever required by the State Commissioner of Health, satisfactory detailed plans for the separation, interception and treatment of the entire sanitary sewage of the city shall be prepared and submitted to this Department for approval; and that within the time limit stated in such requirement the construction of any or all works shown by such plans as may be specified shall be completed and put in operation.

EUGENE H. PORTER,
State Commissioner of Health

April 17, 1912

WATERVLIET

Plans for proposed sewers in Third street, Second avenue, and other streets were approved on June 20, 1912, and a permit was granted to the common council of Watervliet on the same date, allowing the discharge, into the Hudson river, of sewage from the proposed sewers on condition that plans for the interception and preliminary treatment of the entire sanitary sewage of the city be submitted to this Department for approval on or before February 1, 1913.

Plans for a proposed sewer in Third avenue and Eighth street were approved on July 31, 1912, and a permit, similar to the permit granted to the city on June 20, was issued to the city authorities. The permits and reports on the examination of the plans follow:

ALBANY, N. Y., *June* 19, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for proposed sanitary sewer extensions in the southern portion of the city of Watervliet, Albany county, resubmitted to this Department for approval by the commissioner of public works on June 18, 1912.

Plans for sewers on the combined plan in this section of the city were first submitted for approval on April 11, 1912, but the inadvisability of constructing combined sewers was pointed out to the city officials inasmuch as the existing system of sewers in the city is almost entirely a separate system and the plans were accordingly returned for revision.

After considerable correspondence and a number of conferences between this division and the city authorities, a general plan of the city, dated May, 1912, showing the existing sewer system was furnished the Department and plans for sanitary sewer extensions in the southern portion of the city were submitted for approval.

The general sewer plan of the city shows that it is provided with a comprehensive sanitary sewer system covering practically the entire city and discharging into the Hudson river at some eleven points. It appears from the plans and report of the city engineer, however, that catch basins have been connected with certain of the sanitary sewers and that two short lines of sanitary sewers have been connected with one of the storm water sewers in the southern section of the city. The separation of the storm water and sanitary sewage in this district could in all probability be readily effected at a comparatively small expenditure, if necessary, whenever the treatment of the sanitary sewage of the city shall be required.

It appears from the plans, moreover, that with the possible exception of the existing outlet sewer at Twenty-first street, all of the existing outfall sewers are located at sufficiently high elevations to permit of being intercepted with slight modifications by an intercepting sewer near the river front and conveyed by gravity flow to a suitable point for disposal.

The plans now before the Department and under consideration show that it is proposed to construct a sanitary outfall sewer in Fifth street, Sixth avenue, Fourth street, Second avenue and Third street, extending from the city line to the river and lateral sewers in Fifth and Third avenues. The plans also show that the sewage from the Delaware and Hudson railroad shops is to be discharged into the proposed outfall sewer and it is understood that arrangements have been made by the Delaware and Hudson Railroad Company with the city of Watervliet, whereby the sewage from its shops, which are situated in the town of Colonie, is to be cared for by the city.

The proposed sewers are to vary in size from 8 inches to 18 inches in diameter and are to be constructed with slopes sufficiently steep to produce self-cleansing velocities under ordinary conditions. From our careful examination of the plans it is found that the proposed sewers, if properly constructed, should be adequate as to sizes and capacities to satisfactorily care for the sanitary sewage of the district to be served by it.

It is proposed, however, to discharge the sewage to posed sewer into a shallow channel of the Hudson ri street. It appears from the inspection of this chann tative of the engineering division on June 13, 1912, tl nel is comparatively shallow, there was a considerable nel at the time of the inspection and the sewage frc may probably be discharged into this channel withoul ance. If it is found, however, that the discharge of s gives rise to a nuisance the proposed sewer should l intervening island into the main channel of the Huds some 300 feet.

This brings up the question of the future disposal o ities along the Hudson river which is a very important had been seriously considered by you during the past f your consistent policy that in connection with the apı future sewer construction in this State, provisions sh future disposal of sewage before it is discharged into this State.

The pollution of the Hudson river affects not only t itself but also other municipalities below the city and derive their water supplies from the river. I am of t that the city of Watervliet should take immediate ste hensive study of the sewerage problem of the city with plans for the interception and most appropriate means sanitary sewage of the city.

I would therefore recommend that the plans now befo approved and that a permit be issued allowing the disc the proposed sewer extensions into the Hudson river a street and that the permit contain, in addition to the modification clauses, the condition that detailed plans and preliminary treatment of the entire sanitary sewage with general plans for supplementary or more complete sewage be submitted for approval before February 1, 19

Respectfully submitted,

THEODOI

PERMIT

Application having been duly made to the State Comm as provided by section 77 of chapter 49 of the Laws of Health Law," as amended by chapter 553 of the Laws of chapter 45 of the Consolidated Laws, permission is hereby mon council of the city of Watervliet to discharge sewage sewer extensions in Third street, Second avenue and othe waters of Hudson river at the foot of Third street, withi of Watervliet, in accordance with the plans accompanying t the following conditions:

1. That this permit shall be revocable at any time o fication or change when in the judgment of the State Health such revocation, modification or change shall be
2. That the issuance of this permit shall not be de any way action by this Department on any future appl be made for permission to discharge additional sewag the waters of this State.
3. That only sanitary or domestic sewage and no sto face water from streets, roofs or other areas shall be proposed sewers.
4. That on or before February 1, 1913, satisfactory d intercepting and outfall sewers to convey the entire sa the city of Watervliet to a suitable site for sewage dis gether with detailed plans for works for preliminary tr

sewage by clarification or sedimentation, accompanied by general plans for additional works for more complete treatment of such sewage, shall be submitted to this Department for approval; and after approval of said plans any or all portions of the intercepting and outfall sewers and of the sewage disposal works shall thereafter be constructed whenever required by the State Commissioner of Health.

EUGENE H. PORTER,
State Commissioner of Health

June 20, 1912

ALBANY, N. Y., *July* 30, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed storm water sewer in the city of Watervliet, Albany county, which plans were submitted to this Department for approval by the board of public works on July 3, 1912.

The plans show that it is proposed to construct some 850 feet of 24-inch storm water sewer in Third avenue and Eighth street tributary to the existing combined sewer in Seventh street. The combined sewer into which the storm water from the proposed sewer is to be discharged extends from Fifth avenue to the river and varies in diameter from 18 to 36 inches. It is used principally for storm water but receives at present the sanitary sewage from two comparatively short 8-inch sanitary sewers in Fourth and Fifth avenues which extend between Seventh and Eighth streets.

It appears from the plans and report of the city engineer that these small sanitary sewers which now discharge into the existing storm water sewers at Fourth and Fifth avenues may readily be intercepted by constructing a sanitary sewer in Seventh street from Third to Fifth avenue whenever a complete separation of the sewage and storm water in this section shall be required and I am of the opinion that the storm water to be collected by the proposed sewer may appropriately be admitted to the existing combined sewer in Seventh street.

I would therefore recommend that the plans for the proposed storm water sewer in Third avenue and Eighth street be approved and a permit be issued allowing the admission of storm water from this sewer into the existing combined sewer in Seventh street which discharges into the Hudson river at the foot of this street on the same condition as stipulated in section IV of the permit issued to the common council of the city of Watervliet on June 20, 1912.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

PERMIT

Application having been duly made to the State Commissioner of Health, as provided by section 77 of chapter 49 of the Laws of 1909, the "Public Health Law," as amended by chapter 553 of the Laws of 1911, constituting chapter 45 of the Consolidated Laws, permission is hereby given to the common council of the city of Watervliet to admit storm or surface water from the proposed sewers in Third avenue and Eighth street to the existing combined sewer in Seventh street discharging into the waters of the Hudson river at the foot of Seventh street, within the municipality of Watervliet, in accordance with the plans accompanying the petition, under the following conditions:

1. That this permit shall be revocable at any time or subject to modification or change when in the judgment of the State Commissioner of Health such revocation, modification or change shall become necessary.
2. That the issuance of this permit shall not be deemed to affect in any way action by this Department on any future application that may be made for permission to discharge additional sewage or effluent into the waters of this State.

3. That on or before February 1, **1913, satis** intercepting and outfall sewers to **convey the** the city of Watervliet to a suitable **site for s** gether with detailed plans for works **for preli** sewage by clarification or **sedimentation, accor** for additional works for more complete **treatm** be submitted to this Department for **approval** said plans any or all portions of the **interceptin** of the sewage disposal works shall **thereafter** required by the State Commissioner **of Health.**

WM. A

Deputy Co

July 31, 1912

WEBB (T) (Bald Mountain I

Plans for sewage disposal for the Bald Mountain I Fulton Chain in Herkimer county were submitted for 1912, and after an examination of them by the er plans were returned to the designing engineer for modi in general accordance with the recommendations of resubmitted for approval on October 14 and were date. The permit issued in connection with the ap allows the discharge into Third lake of effluent from disposal plant, consisting of a settling tank, on cor required by the State Commissioner of Health plans more complete treatment of the sewage from the hotel approval. The reports on the examination of the plans

ALBANY, N. Y

EUGENE H. PORTER, M.D., *State Commissioner of Health*

DEAR SIR: — I beg to report as follows on plans for sev mountain on Third lake of the Fulton chain.

These plans were submitted by Mr. Oliver F. Starr, authorization of C. M. Barrett, proprietor of Bald Mo proposed construction of the disposal plant is in respons to the proprietor of the hotel following an investigation in the Adirondack district.

The report of the designing engineer states that the maximum operation accommodates not more than 200 pe hotel is open for about five months in the year.

At present the sewage of the hotel, exclusive of the la charged through an 8-inch vitrified sewer and through pipe into the lake at a point about 125 feet from the sho to construct a settling tank and siphon chamber in front 100 feet from the lake, and to convey the sanitary sev exclusive of the laundry waste, to this tank through a n pipe sewer, and to discharge the effluent from the tank into sewer at the shore line. Above the connection with the set pipe a trap is to be inserted on the present outlet sewer. pipe sewer which now discharges into the main outlet sewer sewage from two cottages is to be connected with the pro the hotel to the settling tank and the connection with the continued.

The proposed settling tank, which is to be of concrete wit crete roof, is 16 feet long, 8 feet wide and about 5 feet deep, of about 4,500 gallons. On the basis of flow assumed, 60 g from 200 persons, the amount of sewage which is to be maximum rate of flow will be 12,000 gallons, which allows of about 9 hours. The sewage enters the tank about 9 inche face through a "T" placed on the inlet pipe and the effluent in the same manner.

The plans show a siphon chamber with a capacity of about 1,300 gallons, equal to about three hours flow of sewage at the maximum rate.

It appears that in general the plans are in satisfactory shape for approval, but that before final approval should be given to them several modifications should be made on the plans submitted. These modifications are as follows:

The siphon chamber shown by the plans should not be constructed at present and the construction should be deferred until supplementary treatment of the sewage shall become necessary. This siphon chamber should be omitted.

1. Because of the unnecessary additional expense entailed in its construction, and

2. Because the effluent from the tank, in view of the fact that supplementary treatment is not to be provided, should flow continuously to the lake and thereby avoid a discharge of accumulated quantities of effluent into the lake within short periods of time.

The present plans may be so revised that the omission of the construction of a siphon and siphon chamber will be indicated on the plans and a pipe connection shown between the outlet "T" from the settling tank to the effluent sewer.

An outlet for the supernatant liquid in the settling tank at an elevation of, say, two feet from the bottom of the tank shall be provided in order to facilitate the emptying and cleaning of the tank when necessary.

The proportion of cement and sand for the concrete mixture with which the tanks are to be constructed is shown on the plans to be one part Portland cement to four parts of sand, the rubble to be laid in the mortar forming the walls. It is preferable in comparatively thin walls, such as the walls of the proposed tank, to use broken stone or gravel rather than heavy stone and furthermore the proportion of cement and sand in any case should not be greater than 1 part cement to 2½ or 3 parts of sand.

I would recommend, therefore, that the plans be returned to the designing engineer for revision and modification as noted above.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ALBANY, N. Y., *October* 14, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report as follows on the plans for sewage disposal at Bald Mountain House resubmitted to this Department for approval this date.

It appears from an examination of the plans that the provisions and modifications recommended in the report to you under date of October 11 and which you requested should be made in the plans, in your letter of October 11 to the designing engineer, have been properly carried out and I therefore beg to recommend that the plans be approved and a permit be issued to Mr. C. M. Barrett which will allow the discharge of effluent from the plant into the waters of Third lake subject to the usual conditions and including a condition relative to the submission of plans for supplementary or more complete treatment of sewage and the construction of such works when required by you.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

WILLARD STATE HOSPITAL

Plans for sewage disposal works consisting of settling tanks, dosing chamber, sprinkling filters, final settling tank, sterilization plant and auxiliary sludge beds for the disposal of sludge to treat the sewage from the Willard State Hospital were submitted for approval on May 29, 1912. These plans were approved on June 13, 1912, on condition that the effluent from the proposed sewage disposal plant be sterilized before its discharge into Seneca lake.

3. That on or before February 1, 1913, satisfactory detailed plans for intercepting and outfall sewers to convey the entire sanitary sewage of the city of Watervliet to a suitable site for sewage disposal works, together with detailed plans for works for preliminary treatment of such sewage by clarification or sedimentation, accompanied by general plans for additional works for more complete treatment of such sewage shall be submitted to this Department for approval; and after approval of said plans any or all portions of the intercepting and outfall sewers and of the sewage disposal works shall thereafter be constructed whenever required by the State Commissioner of Health.

WM. A. HOWE,
Deputy Commissioner of Health

July 31, 1912

WEBB (T) (Bald Mountain House)

Plans for sewage disposal for the Bald Mountain House on Third lake of Fulton Chain in Herkimer county were submitted for approval on October 10, 1912, and after an examination of them by the engineering division the plans were returned to the designing engineer for modification. Plans revised in general accordance with the recommendations of this Department were resubmitted for approval on October 14 and were approved on the same date. The permit issued in connection with the approval of these plans allows the discharge into Third lake of effluent from the proposed sewage disposal plant, consisting of a settling tank, on condition that whenever required by the State Commissioner of Health plans for supplementary or more complete treatment of the sewage from the hotel shall be submitted for approval. The reports on the examination of the plans follow.

ALBANY, N. Y., *October* 11, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report as follows on plans for sewage disposal at Bald mountain on Third lake of the Fulton chain.

These plans were submitted by Mr. Oliver F. Starr, civil engineer, under authorization of C. M. Barrett, proprietor of Bald Mountain House. The proposed construction of the disposal plant is in response to a request made to the proprietor of the hotel following an investigation of summer resorts in the Adirondack district.

The report of the designing engineer states that the hotel at its time of maximum operation accommodates not more than 200 persons, and that the hotel is open for about five months in the year.

At present the sewage of the hotel, exclusive of the laundry waste, is discharged through an 8-inch vitrified sewer and through a 6-inch cast-iron pipe into the lake at a point about 125 feet from the shore. It is proposed to construct a settling tank and siphon chamber in front of the hotel about 100 feet from the lake, and to convey the sanitary sewage of the hotel, exclusive of the laundry waste, to this tank through a new 6-inch vitrified pipe sewer, and to discharge the effluent from the tank into the present outlet sewer at the shore line. Above the connection with the settling tank effluent pipe a trap is to be inserted on the present outlet sewer. A 4-inch vitrified pipe sewer which now discharges into the main outlet sewer and which carries sewage from two cottages is to be connected with the proposed sewer from the hotel to the settling tank and the connection with the present sewer discontinued.

The proposed settling tank, which is to be of concrete with reinforced concrete roof, is 16 feet long, 8 feet wide and about 5 feet deep, giving a capacity of about 4,500 gallons. On the basis of flow assumed, 60 gallons per capita from 200 persons, the amount of sewage which is to be cared for at the maximum rate of flow will be 12,000 gallons, which allows for a detention of about 9 hours. The sewage enters the tank about 9 inches below the surface through a "T" placed on the inlet pipe and the effluent leaves the tank in the same manner.

The filters, which are to be filled to a depth of about 6 feet with broken stone, have a total area of about ¼ acre and will be required to operate at the rate of about 2,000,000 gallons per acre per day on the basis of the actual water consumption or at the rate of about 1,000,000 gallons per acre on the basis of a per capita rate of sewage contribution of 100 per day.

The effluent from the sprinkling filters is to be passed through a supplementary settling tank which has sufficient capacity to give about 1¼ hours detention of the effluent and should be adequate to provide for clarification of the same.

The plans also show in a general way the supplementary treatment works, consisting of a sterilization plant, by means of which the effluent from the sprinkling filters is to be treated with a disinfectant before it is discharged into the supplementary settling tank.

According to the report of the State Architect the disinfecting plant is to be used only if it is necessary or expedient. It appears, however, that it is important to have this plant put in operation at the first installation inasmuch as the water supply of a number of municipalities as well as the institution itself is derived from the lake.

From our careful examination of the plans it appears that the proposed sewage disposal plant if properly constructed in accordance with the plans and operated with care and efficiency should produce an effluent which may be safely discharged into the lake without objection, and I would therefore recommend that the plans be approved on condition that the effluent from the sprinkling filter be sterilized before its discharge into Seneca lake.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

INDIVIDUAL PERMITS ISSUED DURING 1912, UNDER SECTIONS 76 AND 78 OF CHAPTER 49 OF THE LAWS OF 1909, THE "PUBLIC HEALTH LAW," CONSTITUTING CHAPTER 45 OF THE CONSOLIDATED LAWS

LOCATION	To whom issued	Date	Waste matter	Discharged into —
Boonville (town)	Estate of Robert E. Westcott	Dec. 10	Effluent from settling tank to treat waste water and washings from Alder Creek Milk Station and Creamery.	Tributary of Alder Creek.
Essex (town)	Essex Cooperative Creamery Co.	July 22	Effluent from settling tank to treat waste water and washings.	Tributary of Boquet river.
Gardiner (town)	William T. Edwards	June 11	Effluent from settling tank to treat sink drainage and waste water from residence of Mr. Edwards.	Tributary of Walkill river.
Homer (town)	F. W. Janssen	June 18	Effluent from settling tank to treat waste water and washings from the Little York Creamery.	Outlet of Little York lake.
Jefferson (town)	Joseph H. Gilmore	Sept. 27	Effluent from settling tank to treat waste water and washings from the S. F. S. D. Co. Creamery.	Branch of Middle brook.
Jefferson (town)	Charles Rose	Sept. 27	Effluent from settling tank to treat waste water and washings from Rose's Creamery.	Branch of Middle brook.
Litchfield (town)	Cedarville Milk and Cream Co	June 28	Effluent from settling tank to treat waste water and washings from cheese factory.	Steel's creek.
New York City	General Vehicle Co., Inc	Dec. 12	Sewage and wastes	Newtown creek.
Norwich	F. B. Williams	July 24	Sink drainage and waste water	Chenango river.
Olean (see also page 521)	Cattaraugus Tanning Co	Feb. 19	Effluent from disposal plant to treat wastes from tannery.	Two Mile creek.
Richford (town)	Lehigh Valley Railroad Co	Aug. 6	Effluent from settling tank to treat waste water and washings from Borden's Condensed Milk Co.	East branch of Owego creek.
Rosendale	H. D. Konski	Sept. 27	Effluent from settling ...	
Sacketts Harbor	M. I. Quinn	[illegible]	Sewage from settling ...	
Walton (town)	S. H. Goodrich			

The filters, which are to be filled to a depth of about 6 feet with broken stone, have a total area of about 1/4 acre and will be required to operate at the rate of about 2,000,000 gallons per acre per day on the basis of the actual water consumption or at the rate of about 1,000,000 gallons per acre on the basis of a per capita rate of sewage contribution of 100 per day.

The effluent from the sprinkling filters is to be passed through a supplementary settling tank which has sufficient capacity to give about 1 1/4 hours detention of the effluent and should be adequate to provide for clarification of the same.

The plans also show in a general way the supplementary treatment works, consisting of a sterilization plant, by means of which the effluent from the sprinkling filters is to be treated with a disinfectant before it is discharged into the supplementary settling tank.

According to the report of the State Architect the disinfecting plant is to be used only if it is necessary or expedient. It appears, however, that it is important to have this plant put in operation at the first installation inasmuch as the water supply of a number of municipalities as well as the institution itself is derived from the lake.

From our careful examination of the plans it appears that the proposed sewage disposal plant if properly constructed in accordance with the plans and operated with care and efficiency should produce an effluent which may be safely discharged into the lake without objection, and I would therefore recommend that the plans be approved on condition that the effluent from the sprinkling filter be sterilized before its discharge into Seneca lake.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

taraugus creek it turns southeasterly and cross
westerly and right hand bank of the stream abou
bridge. The sewer formerly discharged under
because of the proximity of the outlet to the hig
some 80 feet down stream.

In August, 1911, during a flood caused by a ra
the stream bed was widened by the water, so th
flow the thread of the stream for a considerable c
some 20 to 25 feet east of its former position. T
an accumulation of sewage over the old stream l
sewer. To correct this condition a ditch was dug
by order of the village, to provide a channel in w
concentrated and flow into the stream at a point l
the sewer was extended by a 12-inch vitrified pipe
distance of about 300 feet to a point removed fro
discharged into the stream.

More recently one of the property owners along tha
has changed its bed signified his intention of reclai
In order to remove that part of the sewer which wou
a change, the village authorities were, at the time c
ing some 100 feet or more of the outfall sewer to a lo
up on the right bank of the former stream bed.

At a point just above the outlet of the 300 feet outl
the banks of the stream, a cesspool or tank, excava
been built. It is said to have an inlet and outlet near
be learned as to the details of its construction, and be
ing, it could not be inspected. It is said by one of
measured it to be 7 feet by 7 feet by 4 feet (the latter
being the depth) and walled with loose stones. On a
ceiving storm water and laid on such steep grades as
seem that this structure would have little value as a
best would serve only as a grit chamber.

There was no considerable odor or nuisance from the
80 feet south of the highway bridge at the time of insp
be recorded that heavy showers had fallen on the pre
was, however, not over one inch depth of sewage over the
sewer at the outlet. Several of the citizens living in
the outlet of this sewer were questioned as to whether or
traceable to this sewer.

Mrs. Hawkins, living on Waverly street, and some 300 fe
outlet 80 feet below the bridge, complained of odors wh
noticeable during southerly winds and in the evening. Sh
ence during the time the sewage was discharged 300 feet
outlet. Mrs. Day, Waverly street house 200 to 225 feet fro
let, also complained of odors. Mrs. Whitmeyer, Waverly
from present outlet, complained of odors. Mr. J. Drew, Wa
350 feet from present outlet, stated that he had never notic
the sewer. Mr. Phflender, living near the present outlet,
of any odor therefrom. Mrs. Ritter, living within 20 feet
receiving sewage from outlet 100 feet above, stated that she
any smell from the discharge.

In my opinion this is a public sewer, having been at le
stalled by or under the sanction of the village, and althou
originally been laid with a view of caring for storm water,
house sewage were subsequently allowed to be made by the
connections are said to have all been made prior to May 7, 1
fore it would seem that the construction of this sewer an
therefrom is not in violation of the act of May 7, 1903, proh
charge of sewage into State waters except by permission of
missioner of Health. The extension of this sewer, however, by
in violation of this act, which also provides that no sewers
structed or extended except by permission of this Department

struction of a comprehensive sewer system to satisfactorily dispose of the sewage of the village is deferred for any length of time, the discharge of sewage from the present sewer 80 feet below the Waverly street bridge will undoubtedly cause a nuisance to those residing in proximity to the outlet. It would seem that, if the outfall of this sewer is properly extended to the proposed outlet some 400 feet below the highway bridge on Waverly street, no considerable nuisance will result with reference to odors reaching the nearby residences. In accordance with section 77 of the Public Health Law such extensions can only be legally made by proper application to this Department, such application to be accompanied by a plan showing clearly the details of the proposed extensions.

In view of your policy, and the intentions of the State Legislature as expressed in recent public health acts with regard to the suppression and prevention of the pollution by sewage of State waters, I beg to say that probably it will be necessary for the village of Cattaraugus to consider, within a reasonable time, the installation of a system for the collection and disposal of sewage from the whole village. The village has already been urged by you to seek this solution of the problem.

I would therefore recommend that a copy of this report be transmitted to the village of Cattaraugus and that they be instructed to file with this Department an application, together with plans, for permission to extend the sewer under consideration to such point as to remove the outlet to a reasonable distance from neighboring dwellings.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

CHAPPAQUA

Request having been made by the local board of health on June 29, 1912, that the Department make an investigation of the insanitary conditions in the village of Chappaqua, due to insufficient drainage, and to advise them in the matter, a representative of the engineering division visited Chappaqua on July 2. The following letter, setting forth the results of the inspection and making certain recommendations, was sent to the local board of health on July 5.

ALBANY, N. Y., *July* 5, 1912.

W. W. Mills, M.D., Health Officer, Town of New Castle, Chappaqua, N. Y.:

DEAR SIR: — Following your request of June 29 for an inspection of the insanitary conditions in the village of Chappaqua, town of New Castle, due to insufficient drainage, I directed Mr. Theodore Horton, chief engineer in this Department, to have an inspection made of the district affected in order that this Department might be in a position to advise the board of health of the town of New Castle relative to the desirability of draining the swamp lands and low lying districts in and near the village of Chappaqua, and relative to benefits to public health which would be likely to result from the proposed improvements.

Accordingly an inspection of the territory affected by the inadequate drainage in and near Chappaqua was made by Mr. H. B. Cleveland, principal assistant engineer in this Department, on July 2 in company with Mr. Robert Haviland of the town board of health and yourself, and from the results of this inspection and from the information collected the following facts are evident:

It appears that the unincorporated village of Chappaqua lies on the southerly slope between the ridge dividing the upper reaches of the Saw Mill river watershed on the south and the Kisco river watershed on the north.

There are two main tributaries to the Saw Mill river in this district which unite in the lower section of the village. The flow of the stream is very sluggish for about two miles below the built-up section of the village, two-thirds of this section of flat gradient lying outside of the town of New Castle and in the town of Mt. Pleasant. Within the village of Chappaqua there

are several drainage ditches, partly open ditches a stones,— in some portions passing under sidewalk utary to the Saw Mill river.

It was found that the ground water level throu the village of Chappaqua was within two or three and that in general no attempt was made to dispose of cesspools, but that such sink drainage was led by the drainage ditches above referred to.

There are but very few houses in the central part side water closets although a public water supply ing the fall of 1911, and in all probability the nu inside plumbing will increase.

There is an area of perhaps twenty-five acres in which is flooded by storm waters during the spring heavy storms in the summer. This flooding occurs a and the other principal streets of the village and at tion water was standing in several cellars in the vi exists in most of the houses in the flat portion of greater part of the year.

There are two questions involved, one being the drainage in the village and lowering of the ground wa being need for a sanitary sewer system, especially in stallation of a public water supply.

It is evident from the inspection of local conditions drainage now reaches the drainage ditches, and I wo thorities to proceed as soon as possible under the pro the Town Law to establish a sewer system in the dist incorporated village of Chappaqua.

Respecting the need for improvement in the gener of the village, it is evident from the inspection that taken, as contemplated by the town board of health, to drainage. In fact, it is understood that this question several years, but that since the principal fall in the be utilized to provide better drainage and a lowering level in the village occurs within the town of Mt. Pleas has existed as to the definite steps which might be tak

I would call your attention to the provisions of chapt dated Laws, the Drainage Law, which provides for th commission on petition to the county court by any pe wet lands affected by inadequate drainage or by the sup on behalf of the town, which commission shall determine age is necessary and whether the proposition is feasibl would, of course, have power to provide for the const ditches in other towns than New Castle and could, there improvement of the stream channel in the town of Mt. Pl evidently be necessary if any relief from the insanitary c paqua is to be afforded by the proposed improvement.

In conclusion I would strongly recommend that your once bring this matter to the attention of the town board. that your board provide for the establishment of a commi the advisability and necessity of carrying out the propo and I beg to assure you that while no detailed studies of provement can be made by this Department, I am ready to sible assistance in the work of improving the sanitary co paqua.

It is proper at this time to call to the attention of th health the necessity and desirability of excluding from open all discharge of sink wastes or house sewage, and as noted urge your board to proceed as soon as possible with the sewer system in the district as provided for by the Town La

Very respectfully,

EUGENE H. PORT

State Commissio

FLEISCHMANNS

A representative of the engineering division visited Fleischmanns and Griffin Corners on September 6, 1912, at the request of the local board of health and made an inspection of the sewerage conditions of these communities. The findings of this inspection are set forth in the following report, a copy of which was sent to the board of health on September 16, 1912.

ALBANY, N. Y., *September* 12, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of sanitary conditions existing in the unincorporated villages of Fleischmanns and Griffin Corners in the town of Middletown, Delaware county. The inspection was made on September 6, 1912, by C. A. Howland, inspector.

These two villages are situated in the Bush Kill Valley in a mountainous region reached by the Ulster and Delaware railroad. They are so close together as to be practically one community and consist largely of summer cottages and hotels and the stores which cater to these. The population, therefore, is variable, being in winter about 700 and in summer about 5,000. The inspector was informed that the present tendency is toward large boarding houses rather than cottages. Considerable building is under way, indicating growth.

The inspector made a thorough investigation of the villages, and later, in company with Dr. C. S. Allaben, the health officer, visited special cases which the doctor indicated. A large amount of waste is to be expected from places of this kind. Furthermore, the people who visit such resorts in the summer months are coming more and more to demand modern sanitation in the buildings. A large majority of the houses have, therefore, flush closets and modern plumbing, made possible by the public water supply of the villages. There still exist, however, a number of outside privies, some of which are in a neglected condition.

The cesspool is the general method of disposing of the sewage after it leaves the buildings. One hotel visited has installed a septic tank. In at least one instance, in the thickly populated part of the village, a cesspool has overflowed into the cellar of an adjoining building. It was alleged that others have from time to time overflowed, creating nuisances. This would seem to be the natural outcome of such methods. Places were observed where garbage is thrown directly upon the ground or near the edges of streams in the villages.

An examination of these streams showed that refuse of all descriptions is disposed of in them. They are littered with tin cans, old clothes and other wastes. A number of privies are close to or directly over these streams. While it is not known that these streams are used for water supply the conditions are unsightly and productive of local nuisances. The inspector was told by the health officer that complaints have been made of the condition of the streams. The records of the Department show that few cases of typhoid have been reported for the town of Middletown, but it was alleged that there are one or more cases every year, many of which are not reported.

From the above data it would appear that conditions in these two villages are not good. The continued use of cesspools and outside privies is productive of nuisances and constitute a possible source of contagion through flies. The condition of the streams, while probably not a direct menace to the health of the community, is yet unsightly and a further source of nuisances. It is quite obvious that where a public water supply exists as in this case, that the only effective and safe method of disposing of the sewage is by the installation of a system of sewerage. A permanent improvement would thereby be obtained which would be a lasting advantage and advertisement for the villages. Quite the opposite from being a burden on the community, it would produce a surety of healthful conditions that should increase the number of summer residents.

But this alone would not be entirely effective. . to keep refuse out of the streams and to dispose ‹ house wastes in such a manner that it will not be breeding place for flies and other insects, and a caus system of sewerage would make the outside privy u

Those cottages and hotels situated upon the hill outside of the reach of a sewerage system should i followed by either subsurface irrigation or some othe

Dr. Allaben called the inspector's attention to across the road at the eastern end of Griffin Corne wastes which give rise to a decided smell and cons pollution evidently comes from a cesspool receiving th lip Shaffer House. This cesspool should be replaced followed by some method of filtration since subsurf appear to be practical from the nature of the soil.

As the villages are not incorporated, in order to b tion of a system of sewerage, it will be necessary to providing for the construction of sewer systems outsid or villages, including sections 230 to 244 of article 11 means that it will be necessary to create a sewer dist of a majority of the owners of real property in the dist in the act.

It would be necessary to have plans prepared to be partment for approval and such plans would have to l petent engineer. The Public Health Law requires onl that they examine and pass upon plans. No funds or provided sufficient to enable the Department to prepare sewers and sewage disposal for municipalities. There engineers in New York city and elsewhere, who make a and I would recommend that the villages employ one of t the local situation and prepare the necessary plans.

As soon as these plans have been prepared and subn ment for approval, prompt attention can be given to the

I cannot too strongly urge these villages to take imn providing their community with this improvement. Tl obtained both as to the security in health, increased be beautiful location by the removal of unsightly refuse standing and desirability of the place as a summer res recommend that a copy of this report be transmitted to tl and their earnest support toward the accomplishment o quested.

Respectfully submitted,
THEODOR

GRIFFIN CORNERS

For the report on the inspection of the sewerage condi munity, see Fleischmanns on page 579 of this report.

NELLISTON

Complaints of the insanitary conditions existing in the ton due to the discharge of sewage into one of the storm v ing been made to the Department, a representative of the eng visited the village on June 22, 1912, and made an inspecti tions complained of. A copy of the following report, setti sults of the inspection and making certain recommendations, local board of health on July 1, 1912.

ALBANY, N. Y., *June* 28, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation of the sewerage conditions of the village of Nelliston, Montgomery county, which was made at your direction on June 22, 1912, as the result of a request from the local health officer that an inspection be made by a representative of this Department.

A complaint of the insanitary conditions caused by the discharge of sewage from the hotel owned by Mr. Arthur Smith into one of the storm water sewers of the village of Nelliston was received by this Department on January 26, 1912. The matter of abating the nuisance complained of was taken up by you with the local board of health and you were advised by the board, upon investigation by them, that it was found that the nuisance was caused by the discharge of the hotel urinal into the storm water sewer in Main street and by urine from horses hitched near the hotel draining into this sewer through a storm water inlet. Later advices from the health officer set forth that the urinal from the hotel had been disconnected from the sewer.

Additional complaints having been received, the matter was again taken up with the local board of health with a view of having the insanitary conditions remedied. You were advised, however, that the local board had been unable to determine the cause of the nuisance and a request was made by them that an inspector from this Department be sent to investigate the conditions complained of or that they be advised as to what further action to take in the matter.

The inspection was made accordingly by Mr. C. A. Holmquist, assistant engineer of this Department, on June 22, in company with Dr. G. L. Meyer, health officer of the village of Nelliston and town of Palatine, and Mr. A. D. Sheffield, member of the local board of health.

It was found from this inspection that although there are some storm water sewers in the village, it is not provided with a public water supply and consequently has no sanitary sewer system. The water supply is derived largely from wells and the resultant sewage is disposed of by means of privies and cesspools and in a few instances by discharging it into the storm water sewers.

The later practice has given rise to the nuisance complained of on Main street. It appears that one of the catch basins constructed by the State Highway Department on the line of the storm water sewer in this street in connection with good roads improvements in the village has a depth of about 2½ feet below the outlet and that water sewage and drainage discharged into the storm sewer above this catch basin undergo putrefaction at certain times as the result of which offensive odors are given off through the openings in the cast iron manhole cover of the catch basin. Papers and a wooden cover had been placed over the manhole cover to keep in the odors, and although no particularly offensive odors were noticed near the catch basin at the time of the inspection, the surface of the liquid in the basin was covered with a dark scum and numerous bubbles of gas were given off when the liquid was stirred which showed that septic action was taking place.

It was suggested by a member of the board of health that the insanitary conditions would probably be remedied by filling up the lower portion of the catch basin up to the level with the outlet with cement in order to prevent water and sewage from being retained therein and becoming stagnant and offensive. It would appear that it would not be advisable to fill the catch basin as suggested, inasmuch as no opportunity would be had for settling out the sand and gravel which are washed into the catch basins during times of storm and these substances would in all probability be carried into the sewers and tend to clog them. It is very probable, moreover, that no nuisance would be created from this source provided the catch basin be cleaned out and no sewage were discharged into the sewer.

Further inspection showed that the wash basin in the bar room of Arthur Smith's hotel discharges into the open end of a cast iron house connection which connects with the storm sewer and catch basin in Main street referred to above, and that a small lead pipe from the urinal, also located in the bar

room, formerly connected with the lead drain pip short distance above the point where it enters tl pipe from the urinal had been disconnected from th a way, however, that the end of it could be inserted connection leading to the storm sewer by simply r from the urinal.

Although the lead drain pipe from the urinal was of the house connection at the time of the inspecti the inspection that it had not been disconnected f of time. The discharge of the urinal into the cella moreover, be a very insanitary practice which sho would give rise to very insanitary conditions if co

It is evident, therefore, that the proprietor of th some other suitable means of disposal of the drai basin and urinal and that the wash water from th discharged into the surface connection of the stor nection from the hotel should be cut off at the st tually prevent the discharge of sewage from the w the storm sewer in Main street.

This storm sewer in Main street discharges into through the northern section of the village and river, and inasmuch as no permit has been issued village of Nelliston nor to any of the property ov ing the discharge of sewage into any of the waters of sewage into this stream through the storm wat a direct violation of the Public Health Law.

The inspection also showed that the storm wate ceives drainage from the wash basin and bar of t River and Main streets and all of the domestic sew the sink drainage from another residence on Rive charges into a drainage ditch near the tracks of t Hudson River railroad near River street and th storms finds its way to the Mohawk river. Althou received in reference to this sewer, a nuisance and in all probability result from the discharge of sew erty in close proximity to River street. The ho hotel and two residences on River street should b heretofore set forth.

In conclusion I would say that a nuisance is cr the illegal use of the storm water sewers in the ceive and convey sewage, and that all house connect buildings discharging sewage or sink drainage int disconnected and other means adopted for the disp catch basin on Main street should also be cleaned

I would therefore recommend that a copy of thi the local board of health and that they be requeste under the Public Health Law to abate the nuisanc of sewage, wash water and wastes into the storm suggested in the body of this report.

Respectfully submitt

TH

PEARL RIVER

The board of education of Pearl River having as the disposal of sewage for a proposed district scho engineering division visited the village on Februa inspection of the local conditions with a view of ad with reference to the question of sewerage and sew munity as well as for the school. The findings of

cussed in the following report, copies of which were sent to the board of education and to the local board of health on March 11, 1912.

ALBANY, N. Y., *February* 16, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon an investigation made by the engineering division in the matter of the needs for sewerage and sewage disposal at Pearl River, particularly in reference to caring for the sewage from the Pearl River High School.

Pearl River is an unincorporated village in the southern part of Rockland county adjacent to the New York-New Jersey State boundary line. It is on the New York and New Jersey railroad of the Erie railroad system, 27 miles from New York city.

The village is situated on the watershed of the Hackensack river and the immediate territory is tributary to several small streams whose waters eventually enter the Hackensack river above the intake of the Hackensack Water Company, which takes its supply from this river at New Milford, N. J. Pearl River is about 12 miles above New Milford measured along the line of shortest stream flow.

On February 1, 1912, this Department received communication from Mr. E. Ketchem, the secretary of the board of education of Pearl River, asking advice in regard to the disposal of the sewage from a new school which the district proposes to build and requesting that if necessary an inspection be made by a representative of this Department.

I therefore detailed one of the assistant engineers, Mr. A. O. True, to make an inspection of the premises and to inquire into any other conditions bearing upon the matter.

The assistant engineer visited Pearl River on February 2, 1912, and in company with Mr. N. W. Carpenter and Mr. H. D. Angelbeck, members of the board, inspected the present school premises and the three proposed sites for the new school.

The present school occupies a site a little less than a quarter of a mile east of the railroad station and 250 to 300 feet west of one of the streams already mentioned as being tributary to the Hackensack river. It is on the northern side of the road extending directly east from the railroad station. It occupies a corner lot and is perhaps 75 or 80 feet back from the highway. It is a wooden building and is attended by about 360 pupils. The village has as yet no public system of water supply or sewerage and the present school has a privy vault on the easterly side of the lot.

One site for the new school is on the lot adjacent to and directly north of the present school. This site is a few feet higher than that of the present school, which is on a low flat ground sloping gently off toward the stream on the east.

Between the stream and the school property, a distance of some 200 feet, the ground is low and marshy and little, if any, above the stream level at wet times. The cellar of the school building is about 4½ feet below grade and the floor is said to be wet in the spring months. The ground surface at the building appeared to be about 4 to 5 feet above the general level of the low land adjacent to the stream. The material immediately underlying this low ground appears to be largely clay and therefore unsuitable for any natural area for sewage purification.

A second site considered for the new school is a tract of land about 400 feet square at Central avenue and Henry street. This site is on high ground about half a mile northeast of the present school. The third site is near the top of the hill at Washington avenue and North Main street and is about 4 acres in extent. Both of these two last-mentioned sites are some 50 or 60 feet higher than the site next to the present school, but are ½ to ¾ of a mile distant from the center of the village.

The village has in contemplation, I understand, the installation of a public water supply for fire protection and household purposes to be taken from the system of the Hackensack Water Company. I have not learned that the question of a public sewer system has been or is under consideration.

In view of the size of this village and the loc public system of water supply the question of s ciated with water supply from a sanitary standpo The disposal of the relatively large amount of water carriage system must always be carefully standpoint of health and economy.

In the absence of a sewer system this sewage n pools. This is an insanitary, expensive and unsat munity as thickly populated as Pearl River. houses, or for houses of a sparsely settled comm fully protected cesspools afford a fairly sanitar of sewage disposal. In well built up areas, howe cesspools may become a menace to the health o be leaching cesspools the limit of the capacity of s ing and purifying the liquid impurities is soon permanent pollution of the soil results. If the tight or are in impervious or waterlogged groun the proper time to prevent dangerous and intolera overflow of the sewage on the surface of the gr has shown it to be difficult, if not impossible, to p of a large proportion of water-tight cesspools in munity, also the expense to property owners of em proportionately larger than the cost of installing sewer system.

I cannot too strongly emphasize the importance by the local authorities of these co-ordinate pr supply and public sewage disposal for the commu are matters which not only must be considered in new school buildings, if the latter are to be const but they also affect the future health and welfar

Unless it can be shown that comprehensive for the village cannot be expected for a considera I would not recommend that an individual sewage for or constructed to care for the sewage of the of public water supply should be installed in the vision be made for public sewers it would of cour the necessary land and construct a satisfactory sew school in the event that inside closets were require of Education. Such a course, however, would be system of sewerage and sewage disposal were const

I have considered this matter independently o of the sites in question. The question of the b building is outside the authority of this Departm considered only those matters pertaining directly t supply and sewage disposal. The question of the with local authorities subject to the approval of Education.

With regard to the establishment of a public sev of Pearl River, such a system would have to be with the provisions of the Town Law covering su visions for the establishment of a district for such in the Town Law, sections 230 to 244 inclusive as 1911.

I therefore recommend that a copy of this repo board of education of Pearl River and the board Orangetown, and that they be urged to confer wit wise place before the community the importance of it is desirable to make in connection with the const in order that the most economical solution of their

Respectfully sul

THEOI

ROME (State Custodial Asylum)

Request having been made by the superintendent of the Rome State Custodial Asylum that the Department make an inspection of the sewage disposal plant at the institution, a representative of the engineering division visited Rome on November 27, 1912. Copies of the report setting forth the results of the inspection and making certain recommendations were sent to the State Architect and to the superintendent of the institution on December 10, 1912.

ALBANY, N. Y., *December* 7, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an inspection of the sewage disposal plant at the Rome State Custodial Asylum which was made at your direction and at the request of the superintendent of the institution.

Plans for the sewage disposal plant, consisting of a settling tank, dosing chamber, sprinkling filter and final settling basin, were approved by this Department on May 27, 1909, and on May 24, 1910, plans providing for a complete separation of the sanitary sewage and storm water at the institution were approved. The plant was completed and put in operation about a year ago and the effluent from it has since been discharged into a ditch on the institution grounds which is tributary to Wood creek as shown by the plans.

The inspection of the plant was made by Mr. C. A. Holmquist, assistant engineer of the Department, in company with Mr. Anderson, chief engineer of the asylum, on November 27, 1912. It was found from this inspection that the disposal plant had not been constructed in complete conformity with the plans as approved and that it was not in all respects operated in accordance with the design.

In the first place the plans provide for a disposal of the sludge from the preliminary settling tank in trenches located near the sprinkling filter about 500 feet from the settling tank. The sludge pipe has, however, been extended and now discharges into a ditch which receives the effluent from the plant a short distance below the final settling tank and the result is that this ditch for a distance of nearly one-quarter of a mile is nearly filled with sludge, thereby practically defeating the purpose for which the plant was constructed.

Although no offensive odors were noticed near the ditch at the time of inspection, owing largely to the weather conditions, a decided nuisance would in all probability be created by this practice if continued during certain periods of the year, and it should by all means be stopped. The ditch should be cleaned out thoroughly and the sludge from the settling tank should either be disposed of as provided for by the original plans or discharged onto properly constructed sludge beds.

It was also found that an air lock device had been constructed in connection with the dosing chamber in place of the ball float apparatus shown by the approved plans. This new device, which, if properly operated, should produce a variable head on the sprinkling nozzles by the alternate filling and emptying of the dosing chamber, is not operated in accordance with the intention of the design and a uniform flow of sewage to the nozzles under a constant head is obtained, the only fluctuation being that due to the variation of the flow of the sewage to the settling tank. This is due to the fact that in order to prevent frequent clogging of the nozzles they have been opened so that the flow through them when three out of the five lines are in operation is equal to that of the maximum rate of contribution under a head equal to about one-half the maximum available head. The sewage flow is therefore prevented from gaining on the flow from the dosing chamber and setting back in the settling tank while the dosing tank is emptying so as to give a varying head on the nozzles and a uniform distribution over the surface of the filter. As a result of this operation only a portion of the available area is used and considerable clogging and pooling of the surface of the filters has taken place around the nozzles. The efficiency of the filter is also reduced inasmuch as the portions of the filter near the nozzles are operated at an excessively high rate while other portions are not used at all.

In order to get a uniform distribution over the
a varying head the outlet should either be modifiec
will operate properly under an average rate of flov
siphon of some standard make should be installed.
It is also found that fibre pipe has been sub
risers to which the nozzles are attached as show
and that considerable trouble has been experienced
fragile material. In fact one of the risers was b
of the stone which throws the entire line out o
breakages of this kind occur it would seem advi
should be substituted for the fibre pipe now used.
Although the final settling basin has been insta
with the plans, the material in which it has b
appear to be suitable for a structure of this kin
the vicinity of the plant is a soft, black muck
well when subjected to flowing water. The result i
settling basin has been reduced by caving in of th
capacity of the basin has been further reduced by t
from the sprinkling filter and possibly from the
when the preliminary settling tank is blown off so
settling basin has been reduced to a negligible qu
effluent collected from the outlet of the settling ba
coarse suspended matter which would undoubtedly
to some two hours' detention.
The basin should either be cleaned out thoroug
basin should be constructed. Such structure sh
compartments in order to facilitate cleaning.
In conclusion I would state that, although no a
samples of effluent collected from the primary an
efficiency of the plant as operated appears to be
for which the plant was constructed is largely, if nc
by the discharge of sludge from the preliminary se
age ditch tributary to Wood creek.
The efficiency of the plant could be increased
additions, modifications or changes:

1. By discontinuing the discharge of sludg
and disposing of it in trenches or on properl
2. By modifying the dosing apparatus so a
on the nozzles and a more uniform distributio
filter.
3. By substituting cast-iron pipe for the p
more difficulty is experienced from breakage.
4. By installing a final settling tank of
divided into two compartments so that one c
while the other is being cleaned.

I would therefore recommend that copies of th
State Architect and to the superintendent of th
Asylum and that they be urged to carry out the r
in this report.

Respectfully su
THEO

ST. REGIS FALLS

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to submit the following repor
sewerage conditions of St. Regis Falls, which was m
at the request of the health officer of the town of W
quist, assistant engineer of the Department on Nov

expensive and insanitary in densely populated vi
other than a menace to public health and this is
Falls where the soil is comparatively imperviou
close to the surface and where the water supply i

Improperly constructed privy vaults are equal
able when located near wells and they should be
ably with water tight removable receptacles so tl
regularly.

It is manifestly evident that the most import
as respecting public health is an adequate publi
sewer system is an almost equal necessity, inasn
for the use of cesspools rarely exist. A public
over, be much cheaper in the long run than a larg
plants on individual lots.

It would appear, however, that before a sew
sewer system constructed, steps should be take
pany to extend the present water supply system
if satisfactory service cannot be obtained from
district could be formed under the provisions of

Both of these much needed improvements can
satisfactorily and expeditiously under the Villag
Law and I am of the opinion, therefore, that bo
nomical point of view the community which is
has all the appearances of a village should take

There is no question of the desirability of bot
system and a comprehensive sewer system inasn
outgrown the more primitive means of water
existing in the greater portion of the community

I would therefore recommend that a copy of thi
board of health and that they be advised to brin
the attention of the taxpayers who should also
direction of a competent sanitary engineer in ma
ments. They should also be advised that any se
in the community should be in accordance with
visions of the Public Health Law, must first be s
this Department. Respectfully submi

T

A copy of this report was sent to the local b
10, 1912, urging them to take up, with the taxpa
of making the necessary and much needed improv
and sewerage facilities.

SINCLAIRVILLE

A representative of the engineering division vi
quest of the local board of health and made an
conditions of the village on October 31, 1912. Th
are set forth in the following report, a copy of
authorities on November 19, 1912, urging them
carry out the recommendations contained therei
desire of this Department to co-operate with the
the necessary improvements.

ALBANY,

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following repo
condition of sanitation in Sinclairville, Chauta
reference to sewerage.

in the summer when the flow is reduced dis
Mr. Bargar alleged that the brook had flow
about forty-five years.

Mr. Galbreath lives just above the culvert o
that his children were accustomed to play in t
fell sick with a fever diagnosed by the attendi
Further, a case of typhoid had previously occu
because of the fact that the sewage from this
into a cesspool not near the brook it was bel
have been caused in this way. Even so, it
danger of spreading contagion in this way fr
the hotel, stores or saloon is great. Dr. Clel
the community is in general good and that cas
others are not prevalent. Marked improvement
installation of the water supply. Previously
had appeared in the village and these had seem
the course of the brook but were not so prevaler
in company with Dr. Cleland, investigated th
and found that while this is undoubtedly pollu
its larger volume and the more scattered popul
tion is not so marked.

From the above inspection it appears that t
around the brook and its tributary flowing thr
to cause a public nuisance and menace to t
Since the conditions obviously create a public nu
tion of the Public Health Law and immediate
the abatement thereof. In order to accomplish
refuse must be removed from the stream, whicl
by other means. As the village is provided wi
the only means of disposing of this sanitary se
effectively safeguard the public health is to i
As more and more of the houses install insi
sewerage will become more imperative. The
temporary relief of conditions in the brooks migh
the providing of adequate sewers. These will
benefit and safeguard to the health of the inhal
attraction toward bringing business to the vill
therefore be provided for disposing of the wast
protecting the health of the employes.

I would recommend therefore that the village
immediate steps toward the installation of suc
sewage disposal works to treat the sewage befo
creek. It will be necessary for the village to p
visions of the Village Law covering sewerage s
in preparing and submitting plans to this Depa
found therein.

The inspector was asked regarding the furnis
an approximate estimate of cost. It is usual i
to employ some competent engineer who will mak
tions which are necessary before the most eco
and sewage disposal can be determined and pla
based an estimate of cost. Each case presents
which must be carefully investigated and studie
value can be made.

I would finally recommend that a copy of th
the village authorities and that they be advis
toward carrying out the recommendations conta

Respectfully

THE

communities, is insanitary and expensive in thi
comparatively impermeable subsoil, as conditio
case in the central parts of the village of Spri
be emptied frequently at considerable expense to
to avoid intolerable nuisances from overflow. T
of storage for sewage in close proximity to d
buildings is attended with danger to health beca
the spreading of possible infectious material by
carriers of disease. In this latter particular op
as noxious as cesspools and are greatly to be
uncontrollable possibilities for evil as sources of

In this connection should be mentioned anot
method of sewage disposal as practiced at Spring
to the attention of the assistant engineer by th
center of the business section of the village som
come inaccessible for the purposes of emptying a
proximity and arrangement of adjacent buildings
been made to existing buildings. In some instan
necessary to carry the suction lines from the ces
the cesspool through the front entrances and al
ground floors of such buildings. Such an undesi
cedure needs no further comment in the light of

Investigation of the rear premises in the cent
vealed many insanitary conditions. In addition
arising from overflowing cesspools, there are man
insanitary privies in the narrow limits of adjace
instances evidences of the throwing of slops upon
near the houses.

It is not my purpose in this report to enter i
neering features with regard to the installation of
and a sewage disposal works at Spring Valley.
as I can ascertain from a necessarily brief inv
indicate that such works can be built and mai
and at reasonable cost. It is most probable that
ered to take the whole sewage flow by gravity t
eastern part of the village, where purification wo
by gravity.

I am convinced of the desirability and need for
Valley to serve the future as well as the present

I therefore recommend that copies of this rep
authorities of the village of Spring Valley and t
sider immediately this important question of sewe
and that they proceed, under the direction of a co
plans for a comprehensive and modern system of
disposing of the sewage of the village in the most
manner, these plans to be submitted to this Depart
procedure, as I have pointed out in former cases,
Village Law relating to sewerage, and whereas, an
make proper provision for all parts of the village
it will be possible and feasible to build at present
of the State Commissioner of Health, only that po
are necessary from the standpoint of health and e

Respectfully su

THEO

In addition to the foregoing inspections were made
correspondence, in matters relating to sewerage and
following places: Dunkirk, Nyack, Patchogue, R
Electric Works), Ticonderoga, Weedsport, West Sen

PROTECTION OF PUBLIC WATER SUPPLIES

matter from the lake and boats; that the excreta on the beach is washed into the sand by the storms, and that every precaution is taken to keep the place sanitary.

The inspector, in company with Dr. Frank Sweetland, village president, visited and inspected the lake and the filter plant. The shores are entirely of sand and gravel on that part of the lake occupied by summer residents, with the usual deposits of fibrous vegetable matter and flotsam. At the time of the inspection the water was disturbed and the weather rainy. The prevailing winds in the locality are from the southwest, *i. e.*, from the poultry farm toward the cottages and intake, and the flow of the lake is probably in the same direction. The poultry farm is situated in the southern part of the indentation in which the majority of the cottages stand and about two miles along the shore from the water supply intake.

A boat was obtained and the inspector, accompanied by Dr. Sweetland and Messrs. Bram and Hurd, summer residents, rowed along the shore. Samples of the lake water opposite the farm had an odor of an acrid and pungent nature which was not that of decayed vegetation or silt but suggested that of duck manure. Feathers were floating in the water and these were observed in lessening number along the shore as far north as the intake. Along the shore south of the duck farm the feathers were not so plentiful. This would seem to indicate generally that any pollution from the duck farm would be carried along the shore as far as the intake. At the time of the inspection no odor coming from the poultry farm could be noticed at the cottages east of the farm.

In company with Mr. William Hurley, brother of Mr. Connors, and Mr. Metzger, his assistant, the inspector investigated conditions at the poultry farm. The business is almost entirely devoted to the raising and marketing of ducks. Enclosures have been made of wire netting on the shore. These include a strip of water about 10 feet wide. Mr. Hurley informed the inspector that the ducks are put in these enclosures for about 10 days in order to become clean for market and that a maximum of 8,000 ducks are on the farm at one time. He stated that the farm includes about 3 miles of shore extending southerly beyond the "point" and covers some 405 acres. Considerable of the excreta was noticed on the shore and that remaining upon the surface dried by the sun. It seems reasonable to expect that in times of storm this dried excreta and also some which is impregnated in the sand will be washed into the lake and carried in suspension or solution, thereby polluting the water of the lake.

The cottages use cesspools and outside closets kept, in general, in a sanitary condition, and it is improbable that any direct pollution arises from this source. There is little doubt, however, that a considerable amount of indirect pollution from this summer population of some 2,000 persons occurs in the lake from imperfect infiltration, surface wash, bathing and from accidental and wilful causes. Delaware creek empties into the lake just north of the poultry farm. At the time of the inspection this stream was emptying no large amount of silt into the lake, although at certain times and seasons this stream must carry considerable amounts of silt or mud.

About 600 feet northerly from the boundary of the poultry farm is situated a fresh air mission for children of Buffalo. The inspector was told by the man in charge that the authorities of this institution had the public water supply analyzed by the Buffalo board of health, with the result that they were warned not to use it without boiling and they have therefore discontinued the use of it.

From our inspection it appears that there is little doubt that some pollution is carried from the poultry farm as far north as the intake of the Angola supply. The only positive evidence, however, is with respect to the feathers which are largely floating and easily transported on the surface. It is doubtful whether any appreciable amount of duck excreta either in suspension or solution ever reaches the intake. Any such pollution would, on account of its origin, not have any appreciable effect upon health even though it does tend to destroy the aesthetic quality of the water for bathing and similar

a. A careful patrol of the waterfront, especially during the summer season, to prevent, so far as possible, a contamination of the water from bathing, boating and fishing and pedestrians.

b. Requiring proper methods of sewage disposal at all cottages and camps on the water front.

c. Increasing the efficiency of their filters through enlargement and careful operation.

I recommend that copies of this report be sent to the owner or manager of the duck farm and to the boards of health of the village of Angola and town of Evans and that they be urged to take the necessary steps to correct the insanitary conditions and carry out the improvements recommended above.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters transmitted to the board of health of the town of Evans, to the board of trustees and board of health of Angola and to the manager of the Wm. J. Connors poultry farm.

FIRE ISLAND STATE PARK

An inspection was made relative to a proposed change in the location of wells and a letter transmitted to the State park authorities. For report on the examination of plans for sewerage and water supply, see page 445 of this report.

LETCHWORTH VILLAGE

ALBANY, N. Y., *October* 11, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation made in regard to the protection from pollution of the water supply of Letchworth Village, a State institution for the custodial care of feeble minded persons, located near the village of Thiells, town of Haverstraw, Rockland county. The inspection was made on October 3, 1912, by C. A. Howland, sanitary inspector in company with Dr. Stores of the institution.

The water supply for Letchworth Village is derived from a tributary of the North branch of Miniscongo creek. A dam has been constructed just below the junction of two branches of this tributary forming a reservoir of about three million gallons capacity. The watershed contributing to the two streams and reservoir is mountainous, thickly wooded and but thinly populated. A large portion of the watershed in the vicinity of the reservoir is part of the village property. There is, however, one plot consisting of two parcels of land 26.5 and 25 acres in area lying on the east side of the north branch, which is not owned by the village. This property begins about 250 feet up stream from the dam and extends along the stream about 875 feet. The property does not include the stream but runs within 25 feet of it, extending over the ridge above the stream. Only one small house and several small outbuildings are located on the property. It is only partially cleared and is not farmed to any extent nor were any large number of stock grazing on it at the time of the inspection. The house is located several hundred feet from the stream but on the direct line of drainage above it. The ground is steep and the rainfall upon it, therefore, probably finds its way quickly into the stream and reservoir. The washed condition of the road giving access to the house would indicate this.

From this inspection it appears that due to the direct drainage of this land into the stream and reservoir and its near proximity to them, there is a

constant danger of pollution being introduced into these sources of the Letchworth Village supply. It is obvious that the only sure method of removing this danger is for the State Engineer to acquire this property and maintain it in a sanitary condition.

I would recommend, therefore, that the authorities of Letchworth Village be furnished a copy of this report with the recommendation that steps be taken toward the acquisition of this property with the object of placing it in a condition such that the possibility of pollution of the streets and reservoir by the drainage from this source may be removed.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

A copy of this report was transmitted to the authorities of Letchworth Village.

YORKTOWN (Mohansic State Hospital)

ALBANY, N. Y., *November* 8, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for a proposed water supply system for the Mohansic State Hospital at Yorktown, Westchester county, which were submitted to this Department for approval by the State Architect on October 29, 1912.

The hospital, according to the report of the State Architect, is to have an ultimate population of about 4,000 persons and is to be located on the north shore of the lower end of Mohansic lake. Provisions are made by the plans for a population of 2,000. The potable water supply of the institution is to be derived from the lake and filtered through slow sand filters after aeration and sedimentation. Raw water is to be used for fire protection and irrigation purposes at the institution.

Although there is at present no direct permanent pollution of the lake it is deemed advisable by the State Architect to filter the water supply to be used for potable purposes by reason of the existence of organic matter in the lake water and because both this institution and the New York Training School for Boys, now under development, are to be located on this watershed.

The plans now before the Department show only that portion of the work which includes the intake, the low duty pumping station, the raw water reservoir, filtration plant, the storage reservoir, elevated water tank and piping to a point near the proposed location of the future pump house. It is ultimately proposed to double the area of the filters, to install a 12-inch outlet pipe from the filtration plant to the suction well near the power house, to construct a power house with necessary pumping equipment, and to install a duplicate distributing system for raw and filtered water. Plans for these latter structures and works should be submitted for approval before the construction of them is undertaken.

The intake crib of the proposed water supply system is to be located at a distance of about 500 feet from the shore of the lake where the water reaches a depth of about 22 feet. The water is to be conveyed by gravity flow through a 14-inch spiral riveted steel intake pipe with flexible joints to the pump well at the low duty pumping station. From this point the raw water is to be discharged into the raw water storage reservoir inlet by means of two 5-inch electrically driven centrifugal pumps having a capacity of 750 gallons per minute each. It appears that these pumps should be of adequate capacity to meet the probable future conditions inasmuch as the ultimate water consumption at the institution is estimated at 550 gallons per minute.

The storage reservoir which is to be of reinforced concrete is circular in plan and is to be 42 feet in diameter with a maximum depth of 13 feet. It will have sufficient capacity to give an average detention of about 4 hours when serving a population of 2,000 persons on the basis of per capita rate

of water consumption of 200 gallons per day. '
be of adequate size to permit of an intermitte
pumps and a uniform operation of the filters.
raw water reservoir is to be aerated by passing
the end of the discharge pipe from which it w

From the storage reservoir the water will pas
by means of which a constant head on the filt
raw water will pass from the regulating chamb
inch pipe provided with valves and 6-inch br
distributing nozzles which terminate at the su
beds.

It is proposed at present to install 3 filters
.27 acres, and these units are shown. General
the plans for the future installation of two ad
equal to that of the proposed installation. Th
to the specifications, is to consist of clean, shar
of about .35 mm. The sand in the filters will
feet 3 inches and is to be placed over a layer of
mum depth of 1 foot, 3 inches.

The underdrain system is to consist of 6-inch
pipe spaced 12 feet apart on centers, and mai
of lines of 8-inch vitrified pipe running longit
filter to the other. These underdrains are to
rate of filtration may be determined from gaug
the clear water well.

Under normal conditions the filters will be
of about 2,200,000 gallons per acre per day, al
to rest at all times. Loss of head gauges whic
on the filters before passing through the sand
pipes are to be placed near the floor stands
outlet valves on the filters. By means of thes
in connection with the float valve on the supp
head upon the feed pipe of the filters is obtaine
rate of filtration.

The plans also provide for a storage reservoi
4,000,000 gallons. This reservoir is divided i
water which has a capacity of about 3,000,000 g
water which has a capacity of nearly 1,000,000
reservoir is to serve the laundry, pump house a
tion with the low pressure system. For the hig
will be pumped into an elevated steel tank whi
and equalizing tank having a capacity of about

According to the report of the State Architect
not shown by the plans is to contain 3 centrifu
to be a 1,000 gallon pump for fire protection and
pumps to be used in connection with the potable
details of these structures nor the distributing
for them should be submitted for approval befo

From our careful examination of the plans i
water purification plant, if properly construc
plans, and if operated with care and efficiency s
potable water and I would, therefore, recommend
on condition that plans for the portions of th
shown in detail by the present plans shall be su
the construction of the same is undertaken.

Respectfully subm

T

In accordance with the recommendations of
were approved on November 14, 1912.

POUGHKEEPSIE (Hudson River State Hospital)

ALBANY, N. Y., *June* 18, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report as follows on the plans for improvement of water supply and the extension of water mains at the Hudson River State Hospital at Poughkeepsie. These plans were prepared under the direction of Hon. Herman W. Hoefer, State Architect, and were submitted to this Department on June 5, 1912, as required under section 14 of the Public Health Law.

The water supply for the Hudson River State Hospital is derived from the Hudson river and after filtration through sand filters is pumped from the station near the intake and near the filters to the hospital through an 8-inch pipe line.

It is proposed to add to the water filtration plant a sedimentation basin about 174 feet by 86 feet for the purpose of removing the silt from the river water and thereby improving the efficiency and ease of operation of the sand filters.

In connection with this improvement a new discharge pipe line 16 inches by 12 inches in diameter is to be laid from the pumping station through the hospital grounds to the distributing reservoir and a new line of 8-inch main is to be laid from the present pump in the electric light station to several isolated cottages now served by a small pumping station which is to be abandoned.

The present population of the institution is about 3,700. The present consumption of water per capita daily is about 340 gallons. Under these conditions the capacity of the proposed sedimentation basin is equal to about 18 hours' supply for the hospital and although this would not appear to be a very liberal allowance for the purposes intended, it is probable that considerable improvement will result in the efficiency of the plant when the sedimentation basin proposed is put in operation.

It is also proposed, though not by the present plan, to install coagulant apparatus so that at times when considerable sediment is carried by the river water, alum may be fed to the influent of this sedimentation basin.

From a careful examination of the plans presented it appears that the proposed improvements are properly designed and I would therefore recommend that the plans be approved.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

These plans were approved on June 19, 1912.

ALBANY, N. Y., *November* 21, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an examination of plans for the proposed coagulant apparatus to be installed in connection with the water supply system of the Hudson River State Hospital at Poughkeepsie which plans were submitted to this Department for approval by the State Architect on November 20, 1912.

Plans for the improvement of the water supply and the extension of the water mains at this institution were approved by you on June 19, 1912. These plans, however, did not include the coagulant apparatus which, according to the report submitted by the State Architect in connection with the general plans, was to be installed for the purpose of feeding alum to the effluent of the sedimentation basin at times when there are excessive amounts of sediment in the river water.

The plans now before the Department show details of the proposed coagulating apparatus by means of which a solution of alum is to be fed to the suction of the raw water pumps which discharge the water from the Hudson river into the sedimentation basin for subsidence before filtration.

The apparatus consists of a wooden hoppe
having a total capacity of one barrel. At th
placed a worm gear actuated by a Pelton wat
tain definite quantities of the alum are to b
cated below the hopper. The amount of alum
lating the speed of the worm gear and the w
to be supplied by the waste pipe from the Pelt

The alum solution is to be discharged thro
suction pipes of the low duty pumps at points
the suction well and a thorough mixing of th
water should be thus obtained before the wat
basin.

From our careful examination of the plans i
coagulant apparatus if properly installed and if
ligence should satisfactorily produce the results
I would therefore recommend that the plans be

Very r
T

These plans were approved on November 22, 1
recommendations of the above reports.

ST. JOHNSVILLE

ALBANY,

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following repor
condition of the public water supply at St. Johns

Following a letter under date of September 23, 1
communication from Dr. Charles P. Wagner, healt
St. Johnsville, stating that an analysis of a sample
collected on September 11, 1912, was reported unsa
assistance from this Department, I detailed Assist
to visit St. Johnsville and make a thorough investig
The assistant engineer made this inspection on Se
the preliminary report of this inspection it was d
samples of water for sanitary analysis collected fr
waterworks. This you ordered done, and on Octobe
were collected by L. M. Wachter, chief sanitary chem
State Hygienic Laboratory. The results of these
the results of the analysis of samples of this public
1912, are given in an appended table.

On August 3, 1911, a special investigation was m
supply of St. Johnsville, and my report to you upon t
date of August 14, 1911, contains my conclusions a
regards this water supply at that time.

Following the transmission of this report to th
village has had the services of Mr. Robert E. Horton,
engineer, to make a study of the whole water supply
of St. Johnsville with especial reference to determi
deficiency of the public supply and arriving at the best
ing the present supply or of obtaining a new suppl
results of this study, containing the conclusions and re
engineer, was submitted to the village under date of
Among others were important recommendations concern
leakage in the distributing system and house services,
tion of the distributing reservoir as to insure circula

water from the springs, the exclusion of surface water from the reservoir and its protection from accidental or careless pollution by men or animals, the placing of the surroundings of the reservoir in a thoroughly sanitary condition, the thorough cleansing of the interior of the reservoir and making the walls water-tight, and the continuance of the investigations as to the best means of providing an additional supply. Some of these recommendations have been carried out, with the result that the danger of pollution of the supply has undoubtedly been lessened and a shortage of the supply from the springs prevented by the reduction of waste and leakage in various parts of the distributing works. All of the recommendations of this report have not as yet been acted upon.

It is said that during the past summer no shortage of spring water has been experienced even during the driest season, and that there has always been an excess of this water entering the reservoir from the standpipe and overflowing to waste from the reservoir.

A thorough investigation was made of all parts of the works by Assistant Engineer A. O. True on September 28, 1912. No insanitary conditions were found which appeared to have any direct connection with the water now constituting the public supply. The watershed and surroundings at the springs in Lassellsville appeared to be in satisfactory condition. At the distributing reservoir near the village no direct pollution of the water was found. However, there are indirect opportunities for intermittent pollution from the immediate watershed and possibly direct pollution from leakage from or the accidental opening of the pipe line from the nearby creek.

Mr. Robert E. Horton calls attention in his report to the opportunity for surface water entering the open reservoir and recommends that this condition be corrected. I agree with his recommendations in this regard and would supplement them with the further recommendation that the pipe line from the intake in Zimmerman creek be provided with a valve at its upper end on the bank of the creek in such a way that when this valve is closed there will be unquestionably no opportunity for creek water to enter the reservoir by this pipe line.

The results of analyses of samples taken from this public supply would indicate that ordinarily the water has been in satisfactory sanitary condition since last spring. With the exception of that collected on September 11, 1912, the samples have shown a satisfactory chemical and bacteriological analysis since the one collected from a tap on March 14, 1912. It would appear that the sample of September 11, 1912, had been collected at a time when the water had been subjected to a temporary pollution from accidental or other causes. This could have been the result of a sudden wash of surface water from the road above the precipitous slope on the west side of the reservoir, or by an animal gaining access to the water in the reservoir. The results of the analysis of the samples collected from the various parts of the works on October 1, 1912, show a satisfactory condition of the water at that time.

In conclusion I beg to recommend:

1. That the recommendations made in Mr. Robert E. Horton's report to the village under date of September 25, 1911, be carried out.
2. That all surface waters be excluded from the distributing reservoir preferably by extending the masonry walls to such height as to prevent a water tight barrier to all surface wash.
3. That the piping arrangements at the reservoir be changed in accordance with Mr. Robert E. Horton's report and that the emergency supply from the creek be controlled by a valve at the creek or by other suitable method to preclude the possibility of creek water entering the reservoir at times other than fire or other emergency.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts Per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as —: Free ammonia	Nitrogen as —: Albuminoid ammonia	Nitrogen as —: Nitrites	Nitrogen as —: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+ = present, — = absent): 10 c.c.	1 c.c.	1-10 c.c.
B-6658 C-4322	St. Johnsville	Montgomery	Tap on public supply	12/19/11	5	Clear	1 v.	1 v.	115	11	104	.008	.012	.001	0.26	1.00	1.25	102	101	70	3+0—	0+3—	0+3—
B-7607 C-4638	St. Johnsville	Montgomery	Tap on public supply	2/ 2/12	Trace	Clear	1 v.	1 v.	123	22	101	.026	.048	Tr.	0.34	1.30	0.50	84.3	.....	210	3+0—	3+0—	0+3—
B-7394 C-4980	St. Johnsville	Montgomery	Tap on public supply	3/14/12	5	Clear	1 v.	1 v.	103	8	95	.020	.048	.001	0.40	1.50	0.25	85.7	.....	2,000	3+0—	1+2—	0+3—
B-7938 C-5437	St. Johnsville	Montgomery	Tap on public supply	5/ 2/12	1	Clear	1 v.	1 v.	129	16	113	.004	.028	Tr.	0.24	0.90	0.50	103	98	40			
B-8144 C-5561	St. Johnsville	Montgomery	Tap on public supply	6/20/12	Trace	5	1 v.	2 v.	139	21	118	.002	.042	.001	0.26	0.80	0.50	[illegible]	[illegible]	[illegible]	—	—	—
B-8540 C-5792	St. Johnsville	Montgomery	Tap on public supply	9/11/12	15	[illegible]																	
B-8700 [illegible]	St. Johnsville	[illegible]																					

In addition to the foregoing, inspections were made and reports transmitted to the local authorities or advice was given through correspondence in matters relating to water supplies at the following places:

Hornell
Mt. Morris
Newark (State Custodial Asylum)
New Hartford
Oneida

PREPARATION OF RULES FOR THE P
PUBLIC WATER SUPPLI

In connection with carrying out the work in the protection of the public water supplie division is called upon to draw up for enactm visions of the Public Health Law, rules and sanitary protection of the water supplies of th which have applied for such enactment thro corporation having charge of the waterworks. of such rules and regulations requires that certa by this Department in conjunction with the w and with the local board or boards of health h over the territory embraced by the rules and re

Specifically, the duty of this Department in enforcement of such rules and regulations cons tion and verification of cases of violations re partment by the proper local authorities, and orders to local boards of health to convene and to the rules and regulations. The considerabl work and the routine work of preparing and orders necessitated by a thorough observance of t Law has been done by the engineering division.

There are some 80 water supplies, of a total the State, where rules and regulations have be the provisions referred to. Previous to the draf regulations for any municipality it has been the division to make a careful field inspection of the water supply in question in order that the provis and regulations may be adapted to the individu quirements.

During 1912 there were before the Department for enactment or amendment rules and regulations for the protection of water supplies in the cases of the following municipalities:

Central Valley and Highland Mills (town of Woodbury)
Cortland
Glens Falls
Hornell
Kingston
Peekskill
Philmont
Suffern

Of the above, rules and regulations were enacted for the cities of Cortland and Glens Falls, and the village of Suffern, and the amendments were enacted for the city of Kingston and the village of Peekskill. In the cases of Hornell, Central Valley and Highland Mills and the village of Philmont, rules and regulations were fully drafted, and the Department is awaiting advices from the local authorities before their final enactment.

Abstract of the New York State Public Health Law, providing for the Protection from Contamination of the Public Water Supplies Throughout the State of New York.

Chapter 45 of the Consolidated Laws (Public Health Law), as amended by chapter 695 of the Laws of 1911.

"Section 70. Rules and Regulations of Department.— The state department of health may make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the state, and the commissioner of water supply, gas and electricity of the city of New York may make such rules and regulations subject to the approval of the state department of health for the protection from contamination of any or all public supplies of potable waters and their sources within the state where the same constitute a part of the source of the public water supply of said city. If any such rule or regulation relates to a temporary source or act of con-

tamination, any person violating such ru
be liable to prosecution for misdemeanor
lation, and on conviction shall be punish
ceeding two hundred dollars, or impriso
one year, or both. If any such rule or
a permanent source or act of contamin
ment may impose penalties for the viola
non-compliance therewith, not exceeding
lars for every such violation or non-co
Every such rule or regulation shall be
once in each week for six consecutive we
newspaper of the county where the wat
lates are located. The cost of such public
by the corporation or municipality benef
tion of the water supply, to which the
published relates. The affidavit of the pr
proprietor of the newspaper in which such
is published may be filed, with the rule
lished, in the county clerk's office of such
affidavit and rule and regulation shall be c
of such publication, and of all the facts th
courts and places.

"Section 71. Inspection of water suppl
board having by law the management an
potable water supply of any municipality,
New York, the commissioner of water sup
tricity, or the corporation furnishing such w
make such inspection of the sources of such
such officer, board or corporation deems it
ascertain whether the rules or regulations
partment, and of the commissioner of wa
and electricity of the city of New York, ar
and shall make such regular and special in
state commissioner of health, or the commis
partment of water supply, gas and electricit
New York, may prescribe. If any such inspe
violation of any such rule or regulation relat
rary or permanent source or act of conta

officer, board or corporation shall cause a copy of the rule or regulation violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation, except in a case concerning the violation of a rule or regulation relating to a temporary or permanent source or act of contamination affecting the potable water supply of the city of New York, shall notify the state department of the violation, which shall immediately examine into such violation; and if such person is found by the state department to have actually violated such rule or regulation, the commissioner of health shall order the local board of health of such municipality wherein the violation or the non-compliance occurs to convene and enforce obedience to such rule or regulation. If the local board fails to enforce such order within ten days after its receipt, the corporation furnishing such water supply, or the municipality deriving its water supply from the waters to which such rule or regulation relates, or the state commissioner of health or the local board of health of the municipality wherein the water supply protected by these rules is used, or any person interested in the protection of the purity of the water supply may maintain an action in a court of record, which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred by such violation, and for an injunction restraining him from the continued violation of such rule or regulation. If the person served does not comply within five days with the rule or regulation violated, in case such rule or regulation relates to a temporary or permanent source or act of contamination affecting the potable water supply of the city of New York, the commissioner of water supply, gas and electricity of said city may summarily enforce compliance with such rule or regulation, and may summarily abate or remove the cause of the violation of such rule or regulation or the nuisance so created, and to that end may employ such force as may be necessary and proper; provided, however, that

no building or improvements shall be r
destroyed by the said commissioner of
shall cause measurements to be made
photographs of the exterior views the
ments and photographs shall be at the
of the owners or their attorneys, and fa
right of abatement shall not be deem
Failure to comply within five days wit
lation shall further entitle the city of
tain an action in any court having ju
the recovery of the penalties incurred
for an injunction restraining the perso
such rule or regulation, or creating
nuisance, from the continued violation
tion or continuance of such nuisance;
ment being not exclusive.

"Section 73. Sewerage. When th
health, or the commissioner of water
tricity of the city of New York, shall,
water supply from contamination, mak
the execution of which will require or r
struction and maintenance of any sys
change thereof, in or for any village or
porated or unincorporated, or the ex
require the providing of some public
purification of sewage, the municipalit
the water works benefited thereby sha
construct and maintain such systems
thereof, and provide and maintain
removal and purification of sewage an
of sewage disposal as shall be approv
ment of health, and for that purpos
corporation may acquire, under the gen
the necessary real estate or interest th
for public or private purposes. Whe
such regulation of the state departmen
missioner of water supply, gas and e
New York, will occasion or require th

ing or buildings, the municipality or corporation owning the water works benefited thereby shall, at its own expense, remove such buildings and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any property the municipality or corporation owning the water works benefited thereby shall make just and adequate compensation for the property so taken or injured, and for all injuries caused to the legitimate use or operation of such property. Until such construction or change of such system or systems of sewerage, and the providing of such means of removal or purification of sewage, and until such work or means of sewage disposal and the removal of any building, are so made by the municipality or corporation owning the water works to be benefited thereby at its own expense, and until, except in the case of a municipality, the corporation owning the water works benefited shall make just and adequate payment for all injuries to property and for all injuries caused to the legitimate use or operation of such property, there shall be no action or proceedings taken by any such municipality, officer, board, person or corporation against any person or corporation for the violation of any regulation of the state department under this article, and no person or corporation shall be considered to have violated or refused to obey any such rule or regulation. The owner of any building the removal of which is occasioned or required, or which has been removed by any rule or regulation of the state department of health, or the commissioner of water supply, gas and electricity of the city of New York, made under the provisions of this article, and all persons whose rights of property are injuriously affected by the enforcement of any such rule or regulation, shall have a cause of action against the municipality or corporation owning the water works benefited by the enforcement of such rule or regulation, for all damages occasioned or sustained by such removal or enforcement, including all injuries caused to the legitimate use or operation of such property, and an action therefor may be brought against such municipality or corporation in any court of record in

the county in which the premises or p
situated and shall be tried therein; or su
determined by a special proceeding in th
the county court of the county in whi
situated. Such special proceedings shall
petition and notice to be served by suc
municipality or corporation in the same
commencement of condemnation proceedi
ipality or corporation may make and serve
petition as in condemnation proceedings.
answer shall set forth the claim of the resp
the provisions of the condemnation law sha
the subsequent proceedings upon the petit
any. Either party may, before the service
answer respectively, offer to take or pay a
no costs shall be awarded against either par
ment is more unfavorable to him than his of
ever, that in the case of a summary abate
ipality as hereinbefore provided, no costs
against the owner of the property damaged
sioners of appraisal in their report shall
additional sum as may in their judgment
compensation for witnesses and other nece
claimant. Such municipality shall, withi
days after the confirmation of the report of t
of appraisal, pay to the respective owners a
or corporate, mentioned or referred to in said
favor any sum or sums of money shall be e
ported by said commissioners, the respective
estimated and reported in their favor respecti
interest thereon, and in case of default in the
same within the time aforesaid, the respe
persons or bodies politic or corporate in whos
shall be so reported, his, her or them, their exe
trators or successors, at any time or times, a
first made by him, her or them to such munic
ment thereof, may sue for and recover the sa
interest as aforesaid, and the cost of suit in a

of action against such municipality in any court having cognizance thereof, and it shall be sufficient to declare generally for so much money due to the plaintiff or plaintiffs therein by virtue of this act, and the report of the said commissioners, with proof of the right and title of the plaintiff or plaintiffs to the sum or sums demanded shall be conclusive evidence in such suit or action."

Concerning the obligation of water corporations or departments to provide for the cost of, or for the making of changes or improvements demanded by the rules, but not specifically mentioned in section 73 of the above law, the State Attorney-General has rendered an opinion from which the following is abstracted:

"In my opinion the proper and only lawful construction which can be placed on section 72* of the Public Health Law is that all damages and injury to the owners of any property affected by changes required to be made to comply with the rules of the Department of Health must be ascertained and paid prior to the taking possession of the property, and is a prerequisite to the enforcement of said rules in all cases except such as are a nuisance in and of themselves, in which cases the Department of Health would have power and authority outside of sections 70, 71 and 72* to abate the same. Any other construction would to my mind render the law unconstitutional. In brief, I am of the opinion that the State Department of Health, * * * can make and promulgate rules regulating and controlling the use of premises surrounding the sources in all regards, and that a person violating any of these rules can be punished as provided by the penalties, but before such punishment can be inflicted, the corporations for whose benefit the rules are made and established must pay or tender to the owner of such property affected by the enforcement of such rules an amount equal to all damages for making the changes."

* This section (72) of the old Public Health Law is now section 73 of chapter 45 of the Consolidated Laws (Public Health Law).

CORTLAND

Rules and regulations for the protection fron the public water supply of the city of Cortland derived from springs fed by Otter creek and its

RULES AND REGULATIONS

The rules and regulations hereinafter given, duly i accordance with the provisions of sections 70, 71, 72 an the Consolidated Laws (Public Health Law), as amend the Laws of 1911, and as heretofore set forth shall app to all watercourses entering or ultimately discharging i the springs in the city of Cortland, said springs being supply of the city of Cortland. The term "reservoi these rules is intended to mean and refer to the impo distributing reservoirs on Otter creek and to any additi may be constructed on Otter creek or any of its tr "watercourses" wherever used in these rules is intended every spring, pond (other than the artificial reservoi stream, ditch, gutter, or other channel of every kind, when running, whether continuously or occasionally, ev flow, into the water supply of the said city of Cortland

Wherever a linear distance of a structure or object from a watercourse is mentioned in these rules it is i shortest horizontal distance from the nearest point of t to the high water mark of a reservoir, or to the edge, i bank forming the ordinary high water mark of such wa

Privies Adjacent to any Reservoir or Wate

1. No privy, privy vault, pit, cesspool or any other r used for either the temporary storage or the permane excreta shall be constructed, placed, maintained or all its nearest point within seventy-five (75) feet of an course of the water supply of the city of Cortland nor wi and described as follows: Beginning at a point in t avenue in the city of Cortland in line with the south properties of J. M. Samson and Susan N. Milne, situa avenue, thence running southwest a distance of 380 f line of Townley avenue to a point in said avenue e corner of the lower reservoir of the city waterworks, east, a distance of 304 feet; thence south 3° 29′ west feet; thence north 86° 31′ west, a distance of 489.8 feet line of Townley avenue; thence southwesterly along ce avenue a distance of 660 feet to a point on the center avenue; thence north 85° 50′ west, a distance of 40 87° 00′ west, a distance of 1,031.4 feet; thence south 5° of 514.9 feet; thence south 82° 23′ west, a distance of north 5° 31′ east, a distance of 439.9 feet; thence nort highway, a distance of 1,238.5 feet; thence south 1° 2 633.1 feet; thence north 83° 30′ west across Otter creek, feet; thence north 5° 23′ east, a distance of 838.8 feet; east, a distance of 1,105.7 feet, to a point on center lin south 84° 10′ east, a distance of 1,142.9 feet; thence distance of 421.7 feet; thence south 84° 44′ east, a di thence 41° 31′ east, a distance of 1,854 feet; thence a distance of 1,220 feet, to the place of beginning.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed, maintained or allowed to remain with its nearest point within one hundred and fifty (150) feet of any reservoir or watercourse of the water supply of the city of Cortland, nor within the area bounded and described in Rule 1.

3. Every privy, privy vault, pit or receptacle or place used for the temporary storage of human excreta which is constructed, located, maintained or allowed to remain in between the limiting distances of seventy-five (75) feet and one hundred and fifty (150) feet, as provided by Rules 1 and 2, from which privy or other receptacle the excreta are not at once removed by pump or other satisfactory means through water-tight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall be at all times maintained in an absolutely water-tight condition and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents while being transferred from the privy to the place of disposal shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specifically ordered or permitted by the State Department of Health the excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall, when removed, be disposed of by burying in trenches or by thoroughly digging it into the soil in such place and manner as to effectually prevent their being washed over the surface of the ground by rain or melting snow and at a distance not less than three hundred (300) feet, horizontal measurement, from high water mark of any reservoir, or not less than two hundred (200) feet from the edge, margin or precipitous bank of any watercourse of said water supply, nor shall any such excreta be disposed of within the area bounded and described in Rule 1.

6. Whenever, owing to the character of the soil or of the surface of the ground, or owing to the height of flow of subsoil or surface water, or other special local conditions, it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal, or the garbage or wastes from any dump may be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta or the said trench or place of disposal or the said garbage or waste dump shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, etc.

7. No house slops, bath water, sewage or excremental matter from any watercloset, privy or cesspool shall be thrown, placed, led, conducted, discharged or allowed to escape or flow from any pipe, drain or ditch either directly or indirectly into any reservoir or watercourse of the water supply of the city of Cortland, nor shall any such matters be thrown, placed, led, discharged or allowed to escape or flow on the surface of the ground or into the ground below the surface within three hundred (300) feet of any such reservoir or watercourse nor within the area bounded and described in Rule 1.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothing, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse of the water supply of the city of Cortland; nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse of the water supply of the city of Cortland within one hundred (100) feet of any such reservoir or within seventy-five (75) feet of any such watercourse, nor within the area bounded and described in Rule 1.

9. No clothing, bedding, carpets, harness, vehicle, receptacles, utensils, nor anything that pollutes water, shall be washed, rinsed or placed in any reservoir or watercourse of the water supply of the city of Cortland.

Bathing, Animals, Manure, Compost, etc.

10. No person shall be allowed to bathe in any reservoir or watercourse of the water supply of the city of Cortland, nor shall any animals or poultry be allowed to stand, wallow, wade or swim in said reservoir or watercourse, nor be washed therein.

11. No stable for cattle or horses, barnyard, hogyard, pigpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap shall be constructed, placed, maintained or allowed to remain with its nearest point less than one hundred and fifty (150) feet from any reservoir or seventy-five (75) feet from any watercourse of the water supply of the city of Cortland, nor within the area bounded and described in Rule 1; and none of the above-named objects or sources of pollution shall be so constructed, placed, maintained or allowed to remain where or in such manner that the drainings, leachings or washings from the same may enter any such reservoir or watercourse without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainings, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for the distance of not less than one hundred and fifty (150) feet before entering any such reservoir, nor less than seventy-five (75) feet before entering any such watercourse.

12. No human excreta or compost containing human excrement shall be thrown, placed or allowed to escape into any reservoir or watercourse, nor be placed, piled or spread upon the ground, or dug or buried in the soil within a distance of three hundred (300) feet from any reservoir or two hundred (200) feet from any watercourse of the water supply of the city of Cortland; nor within the area bounded and described in Rule 1; and no manure or compost of any kind shall be placed, piled or spread upon the ground within one hundred and fifty (150) feet of any such reservoir or seventy-five (75) feet of any such watercourse, nor within the area bounded and described in Rule 1.

13. No decayed or fermented fruit or vegetables, cider mill wastes, roots, grain or other vegetable refuse of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse, nor onto the area bounded and described in Rule 1, nor shall they be thrown, placed, piled, maintained or allowed to remain in such places that the drainage, leachings or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse of the water supply of the city of Cortland without first having been passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above-mentioned drainage, leachings or washings shall have percolated

over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of not less than one hundred (100) feet before entering any such reservoir or fifty (50) feet before entering any such watercourse.

Dead Animals, Offal, Manufacturing Waste, etc.

14. No dead animal, bird, fish or any part thereof, nor any offal or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse of the water supply of the city of Cortland, nor onto the area bounded and described in Rule 1; nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of not less than one hundred and fifty (150) feet before entering any such reservoir and of not less than one hundred (100) feet before entering any such watercourse.

Fishing, Boating and Ice Cutting

15. No fish shall be taken from any reservoir or watercourse nor shall any person fish in any reservoir or watercourse or through the ice upon the same, nor trespass upon the waters of any reservoir or watercourse or the ice thereon, nor maintain or use any boat or boats thereon except the officials or duly authorized employees of the city of Cortland in the exercise of their duties in the management and operation of the reservoirs; nor shall any person or persons cut or remove any ice from any of the reservoirs which form or are tributary to the sources of the public water supply furnished by the city of Cortland.

16. No temporary camp, tent, building or other structure for housing laborers engaged on construction work or for other purposes shall be located, placed or maintained within five hundred (500) feet of any reservoir or watercourse of the water supply of the city of Cortland, nor within the area bounded or described in Rule 1.

Inspection

17. The city of Cortland, through its superintendent of waterworks, shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said superintendent of waterworks to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules or regulations, it shall be the further duty of the superintendent of waterworks to promptly notify the State Commissioner of Health of such violations. The superintendent of waterworks shall report in writing annually on the first of January the results of the regular inspections made during the preceding year, stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

Penalty

18. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law) the penalty for each and every violation of or noncompliance with any of these rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred (100) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the city of Cortland, Cortland county, N. Y., were duly made, ordained and established on the 3d day of April, 1912, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York as amended by chapter 695 of the Laws of 1911.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Cortland county, and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the city of Cortland.

GLENS FALLS

Rules and regulations for the protection from contamination of the public water supply of the city of Glens Falls, Warren county, derived from mountain springs and streams tributary to the city reservoirs.

RULES AND REGULATIONS

The rules and regulations hereinafter given, duly made and enacted in accordance with the provisions of sections 70, 71, 72 and 73 of chapter 45 of the Consolidated Laws (Public Health Law) as amended by chapter 695 of the Laws of 1911 and as heretofore set forth shall apply to all streams, lakes and reservoirs on the drainage areas tributary to the reservoirs from which water is drawn for the water supply of the city of Glens Falls, Warren county, New York, which are intended to comprise all watercourses entering or ultimately discharging into the Wilkie, Keenan and Butler reservoirs. The term "reservoir" wherever used in these rules is intended to mean and to refer to the impounding and distributing reservoirs on the streams used as a source of water supply by the city, and to any additional reservoirs which may be constructed on said streams or on any of their tributaries. The term "watercourse" wherever used in these rules, is intended to mean and include every spring, pond (other than the main distributing reservoirs), stream, ditch, gutter, or other channel of every kind, the waters of which, when running, whether continuously or occasionally, eventually flow, or may flow, into the water supply of the said city of Glens Falls.

Whenever a linear distance of a structure or object from a reservoir or from a watercourse is mentioned in these rules, it is intended to mean the shortest horizontal distance from the nearest point of the structure or object to the high water mark of a reservoir or to the edge, margin, or precipitous bank forming the ordinary high water mark of such watercourse.

Privies Adjacent to any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool, or any other receptacle of any kind used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain with its nearest point within seventy-five (75) feet of any reservoir or watercourse of the water supply of the city of Glens Falls.

2. No privy, privy vault, pit, cesspool, or other receptacle used for the permanent deposit of human excreta, shall be constructed, located, placed, main-

tained, or allowed to remain with its nearest point within two hundred (200) feet of any reservoir or watercourse of the water supply of the city of Glens Falls.

3. Every privy, privy vault, pit, or other receptacle or place used for the temporary storage of human excreta, which is constructed, located, maintained, or allowed to remain between the limiting distances of seventy-five (75) feet and two hundred (200) feet, as provided by Rules 1 and 2, from which privy or other receptacle the excreta are not at once removed by pump or other satisfactory means through water-tight pipes or conduits to some proper place of ultimate disposal as hereinafter provided, shall be arranged in such a manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely water-tight condition and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall be removed and the receptacles thoroughly cleansed and deodorized as often as may be found necessary to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and of the adjoining premises.

5. Unless otherwise specifically ordered or permitted by the State Department of Health, the excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall, when removed, be disposed of by burying in trenches, or by thoroughly digging into the soil in such place and manner as to effectually prevent its being washed over the surface of the ground by rain or melting snow, and at distances not less than four hundred (400) feet from any reservoir or watercourse of the city of Glens Falls.

6. Whenever, owing to the character of the soil or of the surface of the ground, or owing to the height of flow of subsoil or surface water, or other special local conditions, it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacles or from any trench or place of disposal, or the garbage or wastes from any dump, may be washed over the surface of the ground or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacles for excreta or the said trench or place of disposal or the said garbage or waste dump, shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Wastes, Etc.

7. No house slops, bath water, sewage, or other excremental matter from any water closet, privy, cesspool, or other source shall be thrown, placed, led, conducted, or allowed to escape or flow in any manner, either directly or indirectly into any reservoir or watercourse of the water supply of the city of Glens Falls, nor shall any such matters be thrown, placed, led, discharged, or allowed to escape or flow onto the surface of the ground or into the ground beneath the surface within four hundred (400) feet of any reservoir or watercourse.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from any creamery, cheese factory, laundry, nor water in which milk cans, utensils, clothing, bedding, carpets, or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse of the water supply of the city of Glens Falls, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below

KINGSTON

In the matter of the application for a modification of the rules and regulations enacted on June 13, 1911, for the protection from contamination of the public water supply of the city of Kingston.

After a careful consideration of the application for a modification of the rules and regulations enacted by this Department on June 13, 1911, for the protection from contamination of the public water supply of the city of Kingston, said application having been made by resolution of the board of water commissioners of the city of Kingston adopted on February 2, 1912, it is

Hereby ordered, That the rules and regulations heretofore adopted for the protection of the public water supply of the city of Kingston on June 13, 1911, be changed and modified as to certain restrictions contained therein in Rules 1 and 3, so that said rules shall be as follows:

Privies Adjacent to Any Reservoir or Watercourse

1. No privy, privy vault, pit, cesspool, or any other receptacle of any kind, or place of deposit, used for either the temporary storage of the permanent deposit of human excreta shall be constructed, placed, maintained, or allowed to remain with its nearest point less than forty (40) feet from any reservoir or watercourse of the Kingston public water supply. For points three (3) miles or more distant up stream from the dam of the lower impounding reservoir of the Kingston public water supply or streams tributary thereto the above limiting distance shall be thirty (30) feet.

3. Every privy, privy vault, pit or other receptacle or place used for the temporary storage of human excreta which is constructed, located, maintained or allowed to remain between the limiting distances of thirty (30) feet or forty (40) feet, as the case may be, and one hundred and fifty (150) feet or fifty (50) feet as the case may be, from any reservoir or watercourse as provided by Rules 1 and 2 from which privy or other receptacle the excreta are not at once removed by pumping or other satisfactory means through water tight pipes or conduits to some proper place of ultimate disposal as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely water tight condition and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

The foregoing modification of the rules and regulations for the protection from contamination of the public water supply of the city of Kingston, Ulster county, N. Y., was duly made, ordained and established on this 10th day of April, 1912, pursuant to the provisions of the Public Health Law, constituting chapter 45 of the Consolidated Laws.

ALEC H. SEYMOUR,
Acting State Commissioner of Health

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Ulster county, and in at least one newspaper in Greene county, and the affidavit of the printer, publisher or proprietor of each newspaper in each county in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the city of Kingston.

PEEKSKILL

In the matter of the application for a modification of the rules and regulations enacted on August 19, 1897, for the protection from contamination of the public water supply of the village of Peekskill.

After a careful consideration of the application, it is

Hereby ordered, That the rules and regulations heretofore adopted for the protection of the public water supply of the village of Peekskill on August 19, 1897, be changed and modified as to certain restrictions contained therein in Rules 1 and 18, so that said Rules shall be as follows:

1. No privy or place for the deposit of human excreta shall be constructed, located or maintained within fifty (50) feet, horizontal measurement, of the high-water mark or precipitous bank of any spring, stream or watercourse of any kind, tributary to the lakes, ponds or reservoirs on the entire watershed of the Peekskill Hollow creek and its tributaries, if such privy or place is within two (2) miles of the intake of the Peekskill water works; nor shall any such privy or place for the deposit of human excreta be constructed, located or maintained within twenty-five (25) feet, horizontal measurement, of the high-water mark or precipitous bank of any spring, stream or watercourse of any kind, tributary to said lakes, ponds or reservoirs, at points distant more than two (2) miles from the intake of the Peekskill water works.

18. No stable, pigsty, henhouse, barnyard, hogyard, hitching or standing place for horses or cattle or other place where animal manure accumulates, shall be constructed, located or maintained within one hundred (100) feet of the highwater mark in any lake, pond or reservoir, or within fifty (50) feet of the highwater mark or precipitous bank of any spring, stream or watercourse tributary to said lakes, ponds or reservoirs, if such structures or places are within two (2) miles of the intake of the Peekskill water works; nor shall such structures or places be constructed, located or maintained within fifty (50) feet of the highwater mark in any lake, pond or reservoir or of the high-water mark or precipitous bank of any spring, stream or watercourse of any kind tributary to said lakes, ponds, or reservoirs, if such structures or places are more than two (2) miles from the intake of the Peekskill water works; except in the case of islands in Oscawana lake where no such structures or places shall be constructed, located or maintained within twenty-five (25) feet of the highwater mark in the lake.

The foregoing modification of the rules and regulations for the protection from contamination of the public water supply of the village of Peekskill, Westchester county, N. Y., was duly made, ordained and established on this 6th day of April, 1912, pursuant to the provisions of the Public Health Law, constituting chapter 45 of the Consolidated Laws.

EUGENE H. PORTER,
State Commissioner of Health

These rules and regulations to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Westchester county, and in at least one newspaper in Putnam county, and the affidavit of the printer, publisher or proprietor of each newspaper in each county in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each publication, affidavit and filing must be paid by the village of Peekskill.

8. No garbage, putrescible matter, kitchen or sink
water from any creamery, cheese factory, laundry, nor
cans, utensils, clothing, bedding, carpets or harnesses
rinsed, nor any polluted water or liquid of any kind s
charged directly or indirectly into any reservoir or wa
supply of the city of Cortland; nor shall any such liq
waste be thrown, discharged or allowed to escape or re
of the ground or to percolate into or through the gro
in any manner whereby the same may flow into any re
of the water supply of the city of Cortland within on
of any such reservoir or within seventy-five (75) feet of
nor within the area bounded and described in Rule 1.

9. No clothing, bedding, carpets, harness, vehicle, re
anything that pollutes water, shall be washed, rinsed o
voir or watercourse of the water supply of the city of

Bathing, Animals, Manure, Compost,

10. No person shall be allowed to bathe in any res
of the water supply of the city of Cortland, nor shall a
be allowed to stand, wallow, wade or swim in said res
nor be washed therein.

11. No stable for cattle or horses, barnyard, hog
house or yard, hitching place or standing place for ho
manure pile or compost heap shall be constructed, pla
lowed to remain with its nearest point less than one hu
feet from any reservoir or seventy-five (75) feet from a
water supply of the city of Cortland, nor within the
scribed in Rule 1; and none of the above-named object
tion shall be so constructed, placed, maintained or allow
in such manner that the drainings, leachings or was
may enter any such reservoir or watercourse without fi
or through such an extent of soil as to have been pro
no case shall it be deemed that proper purification ha
the above drainings, leachings or washings shall ha
through the soil in a scattered, dissipated form and no
ceptible lines of drainage for the distance of not less t
fifty (150) feet before entering any such reservoir, nor
(75) feet before entering any such watercourse.

12. No human excreta or compost containing huma
thrown, placed or allowed to escape into any reservoir
placed, piled or spread upon the ground, or dug or bur
a distance of three hundred (300) feet from any rese
(200) feet from any watercourse of the water supply of
nor within the area bounded and described in Rule 1
compost of any kind shall be placed, piled or spread up
one hundred and fifty (150) feet of any such reservoir
feet of any such watercourse, nor within the area bou
Rule 1.

13. No decayed or fermented fruit or vegetables, cid
grain or other vegetable refuse of any kind shall be
charged or allowed to escape or pass into any reservoi
onto the area bounded and described in Rule 1, nor s
placed, piled, maintained or allowed to remain in such
age, leachings or washings therefrom may flow by or
drains or channels of any kind into any reservoir or wat
supply of the city of Cortland without first having
through such an extent of soil as to have been properl
case shall it be deemed that sufficient purification has
the above-mentioned drainage, leachings or washings

over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of not less than one hundred (100) feet before entering any such reservoir or fifty (50) feet before entering any such watercourse.

Dead Animals, Offal, Manufacturing Waste, etc.

14. No dead animal, bird, fish or any part thereof, nor any offal or waste matter of any kind shall be thrown, placed, discharged or allowed to escape or pass into any reservoir or watercourse of the water supply of the city of Cortland, nor onto the area bounded and described in Rule 1; nor shall any such material or refuse be so located, placed, maintained or allowed to remain that the drainage, leachings or washings therefrom may reach any such reservoir or watercourse without having first percolated over or through the soil in a scattered, dissipated form and not concentrated in perceptible lines of drainage for a distance of not less than one hundred and fifty (150) feet before entering any such reservoir and of not less than one hundred (100) feet before entering any such watercourse.

Fishing, Boating and Ice Cutting

15. No fish shall be taken from any reservoir or watercourse nor shall any person fish in any reservoir or watercourse or through the ice upon the same, nor trespass upon the waters of any reservoir or watercourse or the ice thereon, nor maintain or use any boat or boats thereon except the officials or duly authorized employees of the city of Cortland in the exercise of their duties in the management and operation of the reservoirs; nor shall any person or persons cut or remove any ice from any of the reservoirs which form or are tributary to the sources of the public water supply furnished by the city of Cortland.

16. No temporary camp, tent, building or other structure for housing laborers engaged on construction work or for other purposes shall be located, placed or maintained within five hundred (500) feet of any reservoir or watercourse of the water supply of the city of Cortland, nor within the area bounded or described in Rule 1.

Inspection

17. The city of Cortland, through its superintendent of waterworks, shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said superintendent of waterworks to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules or regulations, it shall be the further duty of the superintendent of waterworks to promptly notify the State Commissioner of Health of such violations. The superintendent of waterworks shall report in writing annually on the first of January the results of the regular inspections made during the preceding year, stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

Penalty

18. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law) the penalty for each and every violation of or noncompliance with any of these rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred (100) dollars.

The foregoing rules and regulations for the protecti **of the public water supply of the city of** Cortland, (**were duly made, ordained and established** on the 3d d **suant to chapter 45 of the Consolidated Laws** (Publ **State of New York as amended by** chapter 695 of th

EUGENI

State Co

ALBANY, N. Y.

These rules and regulations to be operative and v lished at least once each week for six consecutive wee paper in Cortland county, and the affidavit of the pr prietor of each newspaper in which such publication lication was so made, together with a copy of the **must** be filed with the county clerk of that county.

The cost of each such publication, affidavit and fili city of Cortland.

GLENS FALLS

Rules and regulations for the protection fr the public water supply of the city of Glens I derived from mountain springs and streams reservoirs.

RULES AND REGULATION

The rules and regulations hereinafter given, duly cordance with the provisions of sections 70, 71, 72 the Consolidated Laws (Public Health Law) as an the Laws of 1911 and as heretofore set forth shall a and reservoirs on the drainage areas tributary to t water is drawn for the water supply of the city of Gl New York, which are intended to comprise all wate mately discharging into the Wilkie, Keenan and Bu "reservoir" wherever used in these rules is intende the impounding and distributing reservoirs on the of water supply by the city, and to any additional constructed on said streams or on any of their tribu course" wherever used in these rules, is intended t spring, pond (other than the main distributing r gutter, or other channel of every kind, the waters whether continuously or occasionally, eventually fl water supply of the said city of Glens Falls.

Whenever a linear distance of a structure or o from a watercourse is mentioned in these rules, it shortest horizontal distance from the nearest point to the high water mark of a reservoir or to the ed bank forming the ordinary high water mark of suc

Privies Adjacent to any Reservoir or

1. No privy, privy vault, pit, cesspool, or any ot used for either the temporary storage or the per excreta shall be constructed, placed, maintained, o its nearest point within seventy-five (75) feet of ar of the water supply of the city of Glens Falls.

2. No privy, privy vault, pit, cesspool, or other r manent deposit of human excreta, shall be constru

Inspection

The board of water commissioners of the village of Suffern shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said board of water commissioners to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules or regulations, it shall be the further duty of the board of water commissioners to promptly notify the State Commissioner of Health of such violations. The board of water commissioners shall report in writing annually on the first of January, the results of the regular inspections made during the preceding year, stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

Penalty

19. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at one hundred (100) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Suffern, Rockland county, N. Y., were duly made, ordained and established on the 14th day of February, 1912, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York as amended by chapter 695 of the Laws of 1911.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Rockland county, and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the village of Suffern.

the surface in any manner whereby the same may fl watercourse of the water supply of the city of Glen dred and fifty (150) feet of any such reservoir or w

9. No clothing, bedding, carpets, harness, vehicle, anything that may pollute water, shall be washed, reservoir or watercourse of the water supply of the

Bathing, Animals, Manure, Compos

10. No person shall be allowed to bathe in any res the water supply of the city of Glens Falls, nor shall be allowed to stand, wallow, wade or swim in said nor be washed therein.

11. No stable for cattle or horses, barnyard, hogyar or yard, hitching place or standing place for horses o pile or compost heap, shall be constructed, placed, m remain with its nearest point less than two hundre reservoir, or watercourse of the water supply of the none of the above named objects or sources of pollution placed, maintained, or allowed to remain where or i drainings, leachings, or washings from the same may watercourse without first having passed over or thr soil as to have been properly purified, and in no case proper purification has been secured unless the above washings shall have percolated over or through the s pated form, and not concentrated in perceptible lines tance of not less than one hundred and fifty (150) such reservoir or watercourse.

12. No human excreta, cesspool, compost, or other shall be thrown, placed, or allowed to escape into course, nor be placed, piled or spread upon the ground soil, within a distance of four hundred (400) feet from course of the water supply of the city of Glens Falls, post of any kind shall be placed, piled, or spread upon hundred (200) feet of any such reservoir or waterco

13. No decayed or fermented fruit or vegetables, grain, or other vegetable refuse of any kind shall charged or allowed to escape or pass into any reserv shall they be thrown, placed, piled, maintained, or al places that the drainage, leachings or washings there blind, or covered drains or channels of any kind into course of the water supply of the city of Glens Fal passed over or through such an extent of soil as to hav and in no case shall it be deemed that sufficient puri unless the above mentioned drainage, leachings, or w colated over or through the soil in a scattered or d centrated in perceptible lines of drainage, for a dista hundred and fifty (150) feet before entering any s course.

Dead Animals, Offal, Manufacturing W

14. No dead animal, bird, fish, or any part thereof, matter of any kind, shall be thrown, placed, discharg or to pass into any reservoir or watercourse of the v of Glens Falls, nor shall any such material or refus maintained, or allowed to remain that the drainage, therefrom may reach such reservoirs or watercourse w colated over or through the soil in a scattered, dissi trated in perceptible lines of drainage for a distanc hundred (200) feet before entering any such reservoi

Fishing, Boating and Ice Cutting

15. No fish shall be taken from the impounding or distributing reservoirs, nor shall any person fish in said reservoirs or through the ice upon the same, nor trespass upon the waters or ice thereof, nor maintain or use any boat or boats thereon except the officials or duly authorized employees of the city of Glens Falls in the exercise of their duties in the management and operation of the reservoirs: nor shall any ice cutting or other operations incident thereto be allowed on any of the reservoirs which form or are tributary to the sources of the public water supply of the city of Glens Falls except by permission and under rigid inspection and supervision of the board of water commissioners of the city of Glens Falls.

16. No temporary camp, tent, building, or other structure for housing laborers engaged on construction work or for other purposes shall be located, placed, or maintained within five hundred (500) feet of any reservoir or watercourse of the water supply of the city of Glens Falls.

17. No interment of a human body shall be made within two hundred (200) feet of any reservoir or watercourse of the public water supply of the city of Glens Falls.

Inspections

18. The board of water commissioners of the city of Glens Falls shall make regular and thorough inspections of the reservoirs, streams, and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said board of water commissioners to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules or regulations, it shall be the further duty of the board of water commissioners to promptly notify the State Commissioner of Health of such violations. The board of water commissioners shall report in writing annually on the first of January, the results of the regular inspections made during the preceding year, stating the number of inspections made, the number of violations found, the number of notices served, and the general condition of the watershed at the time of the last inspection.

Penalty

19. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law) as amended by chapter 695 of the Laws of 1911, the penalty for each and every violation of or non-compliance with, any of these rules and regulations which relate to a permanent source or act of contamination is hereby fixed at one hundred (100) dollars.

The foregoing rules and regulations for the protection from contamination for the public water supply of the city of Glens Falls, Warren county, New York, were duly made, ordained and established on the 11th day of January, 1912, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York as amended by chapter 695 of the Laws of 1911.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once a week for six consecutive weeks in at least one newspaper in Warren county and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit, and filing must be paid by the city of Glens Falls.

KINGSTON

In the matter of the application for a mod and regulations enacted on June 13, 1911, fo contamination of the public water supply of

After a careful consideration of the application f rules and regulations enacted by this Department o protection from contamination of the public wate Kingston, said application having been made by re water commissioners of the city of Kingston adopt it is

Hereby ordered, That the rules and regulations h protection of the public water supply of the city 1911, be changed and modified as to certain restric Rules 1 and 3, so that said rules shall be as follows

Privies Adjacent to Any Reservoir or

1. No privy, privy vault, pit, cesspool, or any oth or place of deposit, used for either the temporary deposit of human excreta shall be constructed, plac to remain with its nearest point less than forty (4 or watercourse of the Kingston public water supp miles or more distant up stream from the dam of ervoir of the Kingston public water supply or stre above limiting distance shall be thirty (30) feet.

3. Every privy, privy vault, pit or other recept temporary storage of human excreta which is const or allowed to remain between the limiting distan forty (40) feet, as the case may be, and one hund fifty (50) feet as the case may be, from any reser vided by Rules 1 and 2 from which privy or other not at once removed by pumping or other satisfa tight pipes or conduits to some proper place of u after provided, shall be arranged in such manner be received temporarily in suitable vessels or rec times be maintained in an absolutely water tight permit of convenient removal to some place of u after set forth.

The foregoing modification of the rules and reg from contamination of the public water supply of county, N. Y., was duly made, ordained and estab April, 1912, pursuant to the provisions of the Pu ing chapter 45 of the Consolidated Laws.

A

Acting Stat

These rules and regulations to be operative a lished at least once each week for six consecutive paper in Ulster county, and in at least one news the affidavit of the printer, publisher or proprieto county in which such publication is made, that t together with a copy of the rules and regulatio county clerk of that county.

The cost of each such publication, affidavit and city of Kingston.

PEEKSKILL

In the matter of the application for a modification of the rules and regulations enacted on August 19, 1897, for the protection from contamination of the public water supply of the village of Peekskill.

After a careful consideration of the application, it is

Hereby ordered, That the rules and regulations heretofore adopted for the protection of the public water supply of the village of Peekskill on August 19, 1897, be changed and modified as to certain restrictions contained therein in Rules 1 and 18, so that said Rules shall be as follows:

1. No privy or place for the deposit of human excreta shall be constructed, located or maintained within fifty (50) feet, horizontal measurement, of the high-water mark or precipitous bank of any spring, stream or watercourse of any kind, tributary to the lakes, ponds or reservoirs on the entire watershed of the Peekskill Hollow creek and its tributaries, if such privy or place is within two (2) miles of the intake of the Peekskill water works; nor shall any such privy or place for the deposit of human excreta be constructed, located or maintained within twenty-five (25) feet, horizontal measurement, of the high-water mark or precipitous bank of any spring, stream or watercourse of any kind, tributary to said lakes, ponds or reservoirs, at points distant more than two (2) miles from the intake of the Peekskill water works.

18. No stable, pigsty, henhouse, barnyard, hogyard, hitching or standing place for horses or cattle or other place where animal manure accumulates, shall be constructed, located or maintained within one hundred (100) feet of the highwater mark in any lake, pond or reservoir, or within fifty (50) feet of the highwater mark or precipitous bank of any spring, stream or watercourse tributary to said lakes, ponds or reservoirs, if such structures or places are within two (2) miles of the intake of the Peekskill water works; nor shall such structures or places be constructed, located or maintained within fifty (50) feet of the highwater mark in any lake, pond or reservoir or of the high-water mark or precipitous bank of any spring, stream or watercourse of any kind tributary to said lakes, ponds, or reservoirs, if such structures or places are more than two (2) miles from the intake of the Peekskill water works; except in the case of islands in Oscawana lake where no such structures or places shall be constructed, located or maintained within twenty-five (25) feet of the highwater mark in the lake.

The foregoing modification of the rules and regulations for the protection from contamination of the public water supply of the village of Peekskill, Westchester county, N. Y., was duly made, ordained and established on this 6th day of April, 1912, pursuant to the provisions of the Public Health Law, constituting chapter 45 of the Consolidated Laws.

EUGENE H. PORTER,
State Commissioner of Health

These rules and regulations to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Westchester county, and in at least one newspaper in Putnam county, and the affidavit of the printer, publisher or proprietor of each newspaper in each county in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each publication, affidavit and filing must be paid by the village of Peekskill.

SUFFERN

Rules and regulations for the protection f
the public water supply of the village of Suff
derived from the Mahwah river and its trib

RULES AND REGULATION

The rules and regulations hereinafter given, duly
cordance with the provisions of sections 70, 71, 72
the Consolidated Laws (Public Health Law) as an
the Laws of 1911 and as heretofore set forth shall a
and to all watercourses entering or ultimately di
above the intake at the impounding reservoir, sai
water supply of the village of Suffern. The term "
in these rules is intended to mean and to refer to
tributing reservoirs on the stream used as a sourc
village and to any additional reservoirs which ma
stream or any of its tributaries. The term "wat
in these rules, is intended to mean and include
than the artificial reservoirs and filter basins), stre
channel or permeable pipe or conduit of every kind,
running, whether continuously or occasionally, eve
into the water supply of the said village of Suffer
Wherever a linear distance of structure or object
a watercourse is mentioned in these rules, it is int
horizontal distance from the nearest point of the
high water mark of a reservoir, or to the edge, n
forming the ordinary high water mark of such wat

Privies Adjacent to Any Reservoir or

1. No privy, privy vault, pit, cesspool or any ot
used for the temporary storage of human excreta s
maintained or allowed to remain with its nearest
of any reservoir or watercourse of the water suppl
2. No privy, privy vault, pit, cesspool or any ot
permanent deposit of human excreta, shall be c
maintained or allowed to remain with its nearest
(100) feet of any reservoir or watercourse of the
of Suffern.
3. Every privy, privy vault, pit or other recept
temporary storage of human excreta which is
tained or allowed to remain between the limiting
and one hundred (100) feet as provided by Rules
or other receptacle the excreta are not at once
satisfactory means through watertight pipes or co
of ultimate disposal, as hereinafter provided, shal
ner that all such excreta shall be received tempo
receptacles which shall at all times be maintained
condition and which will permit of convenient ren
mate disposal as hereinafter set forth.
4. The excreta collected in the aforesaid temp
under Rule 3 shall be removed and the receptac
deodorized as often as may be found necessary to n
sanitary condition and to effectually prevent an
upon the foundations or floor of the privy. In
utmost care shall be exercised that none of the c
while being transferred from the privy to the p
specified, and that the contents, while being tra
the place of disposal, shall be thoroughly covered

annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specially ordered or permitted by the State Department of Health, the excreta collected in the aforesaid temporary receptacles permitted under Rule 3 shall, when removed, be disposed of by burying in trenches, or by thoroughly digging it into the soil in such place and manner as to effectually prevent their being washed over the surface of the ground by rain or melting snow, and at distances not less than three hundred (300) feet, horizontal measurement, from the high-water mark of any reservoir, or not less than two hundred (200) feet from the edge, margin, or precipitous bank of any watercourse of said water supply.

6. Whenever, owing to the character of the soil or of the surface of the ground, or owing to the height of flow of subsoil or surface water, or other special local conditions, it is considered by the State Commissioner of Health that excremental matter from any privy or aforesaid receptacle, or from any trench or place of disposal, or the garbage or wastes from any dump, may be washed over the surface or through the soil in an imperfectly purified condition into any reservoir or watercourse, then the said privy or receptacle for excreta or the said trench or place of disposal or the said garbage or waste dump, shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

Sewage, House Slops, Sink Waste, Etc.

7. No house slops, bath water, sewage or other excretal matter from any water closet, privy, cesspool or other source shall be thrown, placed, led, conducted, discharged or allowed to escape or flow in any manner either directly or indirectly into any reservoir or watercourse of the water supply of the village of Suffern, nor shall any such matters be thrown, placed, led, discharged or allowed to escape or flow on to the surface of the ground or into the ground beneath the surface within three hundred (300) feet of any such reservoir or watercourse.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water, from any creamery, cheese factory, laundry nor water in which milk cans, utensils, clothing, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse of the water supply of the village of Suffern, nor shall any such liquid or solid refuse or waste be thrown, discharged or allowed to escape or remain upon the surface of the ground or to percolate into or through the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse of the water supply of the village of Suffern within one hundred (100) feet of any such reservoir or within seventy-five (75) feet of any such watercourse.

9. No clothing, bedding, carpets, harness, vehicle, receptacles, utensils, nor anything that pollutes water, shall be washed, rinsed, or placed in any reservoir or watercourse of the water supply of the village of Suffern.

Bathing, Animals, Manure, Compost, Etc.

10. No person shall be allowed to bathe in any reservoir or watercourse of the water supply of the village of Suffern, nor shall any animals or poultry be allowed to stand, wallow, wade or swim in said reservoir or watercourse, nor be washed therein.

11. No stable for cattle or horses, barnyard, hogyard, pigpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap, shall be constructed, placed, maintained or allowed to remain with its nearest point less than one hundred and fifty (150) feet from any reservoir, or seventy-five (75) feet from any watercourse of the water supply of the village of Suffern; and none of the above named objects or sources of pollution shall be so constructed, placed, maintained or allowed to

remain where or in such manner that the drainings, leac from the same may enter any such reservoir or watercours ing passed over or through such an extent of soil as to purified, and in no case shall it be deemed that proper p secured unless the above drainings, leachings or washing lated over or through the soil in a scattered, dissipated fc trated in perceptible lines of drainage, for a distance o hundred and fifty (150) feet before entering any such res seventy-five (75) feet before entering any such watercour

12. No human excreta, compost, or other matter cont thrown, placed, or allowed to escape into any reservoir to be placed, piled or spread upon the ground, or dug within a distance of three hundred (300) feet from a hundred (200) feet from any watercourse of the water of Suffern; and no manure or compost of any kind s or spread upon the ground within one hundred and fifty reservoir, or seventy-five (75) feet of any such waterc

13. No decayed or fermented fruit or vegetables, ci grain or other vegetable refuse of any kind shall be thro or allowed to escape or pass into any reservoir or wate be thrown, placed, piled, maintained or allowed to rem the drainage, leachings or washings therefrom may flow ered drains or channels of any kind into any reservoir water supply of the village of Suffern, without first through such an extent of soil as to have been prope case shall it be deemed that sufficient purification h the above mentioned drainings, leachings or washing over or through the soil in a scattered, dissipated trated in perceptible lines of drainage, for a distanc hundred (100) feet before entering any such reservoi fore entering any such watercourse.

Dead Animals, Offal, Manufacturing W

14. No dead animal, bird, fish, or any part thereof matter of any kind, shall be thrown, placed, dischar or to pass into any reservoir, or watercourse of the lage of Suffern; nor shall any such material or ref maintained or allowed to remain that the drainag therefrom may reach any such reservoir or waterco percolated over or through the soil in a scattered, concentrated in perceptible lines of drainage, for a one hundred and fifty (150) feet before entering a hundred (100) feet before entering any such wate

Fishing, Boating and Ice Cut

15. No fish shall be taken from the impoundin person fish in said reservoir or through the ice u upon the waters or ice thereof, nor maintain or use except the officials or duly authorized employes o the exercise of their duties in the management a voirs; nor shall any ice cutting or other operati lowed on any of the reservoirs which form or are the public water supply of the village of Suffern under rigid inspection and supervision of the boar the village of Suffern.

16. No temporary camp, tent, building or oth borers engaged on construction work or for othe placed or maintained within five hundred (500 watercourse of the water supply of the village of S

17. No interment of a human body shall be (100) feet of any watercourse or within two hun ervoir of the public water supply of the village o

Inspection

The board of water commissioners of the village of Suffern shall make regular and thorough inspections of the reservoirs, streams and drainage areas tributary thereto for the purpose of ascertaining whether the above rules and regulations are being complied with, and it shall be the duty of said board of water commissioners to cause copies of any rules and regulations violated to be served upon the persons violating the same with notices of such violations; and if such persons served do not immediately comply with the rules or regulations, it shall be the further duty of the board of water commissioners to promptly notify the State Commissioner of Health of such violations. The board of water commissioners shall report in writing annually on the first of January, the results of the regular inspections made during the preceding year, stating the number of inspections which have been made, the number of violations found, the number of notices served and the general condition of the watershed at the time of the last inspection.

Penalty

19. In accordance with section 70 of chapter 45 of the Consolidated Laws (Public Health Law), the penalty for each and every violation of or noncompliance with, any of these rules and regulations which relate to a permanent source or act of contamination, is hereby fixed at one hundred (100) dollars.

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Suffern, Rockland county, N. Y., were duly made, ordained and established on the 14th day of February, 1912, pursuant to chapter 45 of the Consolidated Laws (Public Health Law) of the State of New York as amended by chapter 695 of the Laws of 1911.

EUGENE H. PORTER,
State Commissioner of Health

ALBANY, N. Y.

These rules and regulations to be operative and valid must first be published at least once each week for six consecutive weeks in at least one newspaper in Rockland county, and the affidavit of the printer, publisher or proprietor of each newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations, must be filed with the county clerk of that county.

The cost of each such publication, affidavit and filing must be paid by the village of Suffern.

INSPECTIONS OF VIOLATIONS OF RULES] TECTION OF PUBLIC WATER SUP

During 1912, inspections of violations of rul for the protection of public water supplies we necessary orders to local boards of health issued, i the water supplies of the following municipaliti

Avon and Geneseo
Deansboro
Kingston
Peekskill
West Carthage

At Avon and Geneseo, out of twenty-nine twenty-eight were verified and one found abated violation was verified and the attention of the others which should be taken up. Two violati Kingston and the abatement of a number of o Peekskill and West Carthage single violations v proper orders issued.

ISSUANCE OF GENERAL ORDER REGARDING VIOLATIONS OF WATER SUPPLY RULES

In my last annual report reference was made to a special investigation which was undertaken in order to determine the existence of violations of rules and regulations enacted under the Public Health Law to protect public water supplies from contamination. In the carrying out of this investigation, violations were found on twenty-four of the thirty-four watersheds inspected, and as a result of this investigation it was deemed advisable, near the close of the past year, to issue a general order under the provisions of section 71 of the Public Health Law in all cases where rules and regulations have been enacted requiring boards of water commissioners and water companies to make regular and thorough inspections of their watersheds to determine violations of the rules, to take the proper steps to require the abatement of any violations found and to report fully in writing to the State Commissioner of Health on the first day of January of each year the results of such regular inspections with the action taken and the number of violations still remaining.

While the necessity for issuing this general order is obvious, it should be explained that many of the municipalities included in the order voluntarily maintain a careful oversight over the watersheds from which the public water supplies are derived and report promptly to this Department for further action any violations found, as provided by the Public Health Law.

Orders were issued to the Board of Water Commissioners or water company at the following places:

Altamont	Cherry Valley	Cornwall-on Hudson
Amsterdam	Chester	Cortland
Auburn	Cobleskill	Coxsackie
Avon and Geneseo	Cold Spring	Deansboro
Canastota	Corinth	Delhi

Dolgeville
Elmira
Elmira Reformatory
Fort Edward
Fredonia
Glens Falls
Haverstraw
Highland Mills and Central Valley
Hudson
Hackensack Water Company
Ilion
Ithaca
Ithaca, Cornell University
Kingston
Mohansic Lake
Little Falls

Mechanicville
Middletown
Middleville
Monticello
Mt. Vernon
Newburgh
New Rochelle
Norwich
Nyack
Oneonta
Ossining
Peekskill
Penn Yan
Perry
Plattsburg
Pleasantville
Port Jervis
Pulaski
Rochester

Rome
Sarana
Sarato
Sherb
Skane
Sprin
Suffe
Syrac
Syrac
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SPECIAL INVESTIGATION OF PUBLIC WATER SUPPLIES

AMENIA

Following several inquiries regarding the water supply of Amenia and a conference between Dr. G. T. Wetmore and the chief engineer, an inspection of the water supply was made by a representative of the Engineering Division on April 22, 1912. The results of this inspection are set forth in the following report:

ALBANY, N. Y., *May* 17, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a recent investigation made at your order, of the public water supply of the village of Amenia.

Amenia is an unincorporated village in the northeastern part of Dutchess county about twenty-four miles northeast of the city of Poughkeepsie. It is on the Harlem division of the N. Y. C. & H. R. R. R. The present population is about 750.

The public water supply is derived from two sources, the principal one being a small upland stream rising on the hill about three-quarters of a mile west of the village, and a supplementary ground water supply pumped from two driven wells on the flats near the center of the village. The latter supply is used during the dry season usually between the months of July and October.

The upland supply is impounded in a small reservoir formed by an excavation at a point on the bed of the stream where the adjacent banks are very steep for a long distance up the hill sides. The water is held back by an earth filled dam faced with a heavy brick wall on the uphill side. This dam is about 65 feet long and is provided with a spillway about 4½ feet wide a little north of the center of the dam. The water is about 15 feet deep at the dam and some 4 or 5 feet deep at the upstream end of the reservoir. The reservoir has a capacity of approximately 230,000 gallons. Near the northern end of the dam is a submerged brick intake chamber. The intake is a screened 3-inch wrought iron pipe. This pipe passes through the bottom of the dam and conducts the water by gravity to a wooden tank located on the summit of a steep hill in the northern part of the village. This tank is 24 feet in diameter by 24 feet high and has a capacity of 80,000 gallons. The top of the tank is at an elevation of about 725 feet. The average elevation of the village is about 560. From this tank the village distributing system is supplied by gravity.

The other source of supply is taken from two driven wells on the banks of a stream in the center of the village. The wells have pipe casings and are about 6 inches in diameter and 40 feet deep. The wells are said to be driven through a thick surface layer of clay into quicksand and gravel lying beneath the clay. The water is raised from these walls by two triplex pumps driven by independent gasoline engines and discharged into the distributing system. This machinery is housed in a small building located over one of the wells.

The distributing system consists of about 2 miles of water mains ranging from 1 inch to 6 inches in diameter. This includes the 3-inch pipe from the impounding reservoir to the wooden tank in the village. The average

water pressure in the distributing system in the village is per square inch.

The waterworks were built about 20 years ago and the said to have been supplemented by ground water from sev the village. The present wells and pumping station were 5 years ago. The works are owned and operated by the Am pany. Mr. John R. Thompson is treasurer and superin company.

Practically all of the inhabitants of the village are serv water supply. There are about 100 service taps, none of wh There are no records or gaugings of the average daily consu by the village.

The investigation of this supply was made by A. O. True, a of this Department, on April 22, 1912. The assistant engi panied by Dr. L. E. Rockwell, health officer of Amenia, and cerning the waterworks was furnished by Mr. Thompson Water Company.

The upland supply is impounded from a small watershed headwaters of a small mountain stream which flows eventua Mile river. This watershed has an area estimated at about uninhabited and entirely wooded. There were evidences of th of hardwood from the northern part of this watershed. A w up the side of the mountains and through the watershed an on the northern side of the reservoir, as well as the banks above the reservoir. This road is within 100 feet horizontal voir at its nearest point. About ⅜ of a mile above the res branches and one branch crosses the stream.

Near the reservoir and for a short distance along the st road is dug out of a very steep side hill and the deep ruts cepting channel for the surface water during rains. This w rapidly along the ruts and at a low point above the reserv through the side of the road and drained off into the strea cumulations of manure from horses which had passed over noted along these ruts at the time of inspection.

The two wells are located on the right bank of a stream south of the main street of the village. One of them is abo the stream and the other nearby about 20 feet from the strea immediately surrounding the wells is flat and, with reference t ing inhabited ground, low. Within a radius of 100 feet ther with primitive earth vaults in an insanitary condition. One is within a distance of 50 feet of the wells. Just north of the leading into the stream. The water in this ditch was stagn insanitary condition. A 6-inch tile drain receiving roof and s a neighboring house discharges into this ditch. Adjacent t station is the gas plant for the village, which, I understan same management as the public water supply. A large qua or spent carbide has been dumped on the ground adjacent t station in a pool of water which flows freely under the brick the pump house and over one of the wells.

The results of the analyses of samples of water collected f supply of the village in the past two years and analyzed at t enic Laboratory are given in the table shown below. The upland supply of May 8, 1911, is characteristic of a practica water from spring and surface sources. The sample was clear had but a moderate content of nitrogenous organic matter and of hardness. The total bacterial content was moderate and no were found in any of the volumes tested.

All the chemical analyses of the samples from taps on the would indicate that the samples were composed almost whol water. The sample of September 6, 1910, appears to have a co mixture of ground water, and is probably largely water pum

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of waters: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

					Physical				Chemical (Parts per Million)											Bacteriological			
							Odor		Solids			Nitrogen as —						Hardness			B. Coli Type (+ = present, — = absent)		
Laboratory number	Municipality	County	Source	Date of collection	Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
...	Amenia	Dutchess	Tap public supply	9/ 6/10	Trace	20	....	....	154	...	110	.006	.034	.001	0.40	1.50	3.50	109	96	.....	+	+	+
...	Amenia	Dutchess	Overflow from pump	10/ 6/10	Trace	Clear	....	....	306	....	223	.010	.020	.002	6.40	....	6.50	215	194	40	—	—	—
...	Amenia	Dutchess	Tap public supply	10/ 6/10	.....	.....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	325	+	—	—
...	Amenia	Dutchess	Overflow from well	10/ 6/10	.....	.....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	140	+	—	—
...	Amenia	Dutchess	Tap pump house, 2 P. M.	10/25/10	.....	.....	....	....	....	....	....	....	....	....	....	....	3.50	.....	.....	11	—	—	—
...	Amenia	Dutchess	Tap pump house, 3 P. M.	10/25/10	.....	.....	....	....	....	....	....	....	....	....	....	....	5.25	.....	.....	30	—	—	—
...	Amenia	Dutchess	Tap pump house, 4 P. M.	10/25/10	.....	.....	....	....	....	....	....	....	....	....	....	....	5.25	.....	.....	11	—	—	—
...	Amenia	Dutchess	Tap pump house, 5 P. M.	10/25/10	.....	.....	....	....	....	....	....	....	....	....	....	....	5.75	.....	.....	7	—	—	—
...	Amenia	Dutchess	Tap pump house, 6 P. M.	10/25/10	.....	.....	....	....	....	....	....	....	....	....	....	....	6.00	.....	.....	31	—	—	—
...	Amenia	Dutchess	Tap pump house 7.30 P. M.	10/25/10	.....	.....	....	....	....	....	....	....	....	....	....	....	6.12	.....	.....	10	—	—	—
...	Amenia	Dutchess	Blacksmith shop 8.30 A. M.	10/26/10	.....	.....	....	....	....	....	....	....	....	....	....	....	....	.....	.....	80	+	+	—
B-4736, C-2783	Amenia	Dutchess	Tap public supply	2/23/11	Trace	Clear	1 v.	1 v.	60	12	48	.004	.020	.001	Tr.	0.70	2.00	16.9	15	200	—	—	—
B-5129, C-3108	Amenia	Dutchess	Tap from upland supply	5/ 8/11	None	Clear	1 v.	1 v.	26	8	18	.012	.022	.001	Tr.	0.50	1.37	14.3	11	160	—	—	—
B-5906, C-3896	Amenia	Dutchess	Tap public supply	9/20/11	Trace	Clear	1 v.	1 v.	31	7	24	.004	.010	.001	0.02	0.30	1.75	22.1	17	100	3+0—	0+3—	0+3—
B-6284, C-4015	Amenia	Dutchess	Tap public supply	11/ 9/11	Trace	Clear	1 v.	1 v.	34	11	23	.006	.020	.001	Tr.	0.50	1.75	18.3	11	190	1+2—	0+3—	0+3—
B-6255, C-4507	Amenia	Dutchess	Tap public supply	11/ 9/11	Trace	Clear	1 v.	1 v.	44	11	33	.004	.010	.001	0.04	0.20	1.37	15.6	11	50	1+2—	0+3—	0+3—
B-7234, C-4826	Amenia	Dutchess	Tap public supply	2/26/12	Trace	Clear	1 v.	1 v.	51	10	41	.020	.038	Tr.	0.02	0.70	1.00	23.4	8	250	2+1—	1+2—	0+3—
B-7532, C-5108	Amenia	Dutchess	Tap public supply	3/28/12	5	Clear	1 v.	1 v.	28	15	13	.018	.004	Tr.	Tr.	0.50	1.25	9.5	7	20	—	—	—

wells. The analyses of well water indicate that this is a
clear and colorless and free from excessive amounts of ni
matter. The chlorine values are high, the total bacterial
case moderate, and fecal organisms rarely found in the
This indicates that the ground water supplying the wells is
by animal organic matter from the inhabited territory ne
is subsequently purified by its passage through the sand
samples show evidences of pollution. That of February 2(
public supply shows a somewhat high bacterial count and tl
B. coli type in one of the 1 c. c. volumes. The sample coll
1910, presumably from a tap on public supply, showed tl
coli type in as small volumes as 1 c. c. The sample of S(
showed abnormally high chlorine, considerable turbidity, an(
in all the different volumes tested.

These analytical results are consistent with the conditions
sources of public water supply. The upland supply com
wooded watershed with no swamp area or any permanent
tion. It is subject to intermittent pollution, however, from
operations and the wash from the wood road near the rese
are cased and probably not subject under ordinary conditio
lution from their extremely insanitary surroundings. Th
values, however, would strongly suggest that the large amo
other animal organic matter upon the ground near the w
the ground water before it reaches the wells.

In view of the above facts as brought out by this invest
the following conclusions:

1. That the watershed on the mountain near the vi
factory source of water supply for the village with refe
sical features of location, elevation and freedom from pe
of pollution.

2. That the sanitary quality of the water derived f
source is injured by the intermittent washing into the s
from the wood roads above the dam, and possibly from d
pollution from those engaged in the lumbering operation

3. That while the ground water reaching the wells at
analyses were taken appears to have generally been su
cient purifying action in its natural movement throu
this purifying process may at times be interrupted
changes in the ground water levels, or an extraordinary
wells. There is some slight evidence of this interrupt
these analyses, and an extended series of analytical tes
would undoubtedly show a pronounced pollution at times
the population in the vicinity of the wells.

4. That the present driven wells are poorly located i
lated region and surrounded by insanitary surface condit

In view of these conclusions I beg to submit the following re
with reference to the sanitary features of this public water

1. That frequent inspections be made of all parts of
tributary to the impounding reservoir to prevent any pe
tion of the water supply and to minimize the opportunity
wilful pollution.

2. That all lumbering or other operations upon the wa
impounding reservoir be discontinued or carried on onl
control and oversight of the water company and in such a
prevent any pollution of the public water supply.

3. That the insanitary conditions surrounding the wel
supply an unsafe one to rely upon as a supplementary
should be abandoned as soon as a new supplementary su
mended below can be secured.

4. That owing to the inadequacy of the present upland water supply and the insanitary surroundings and unsafe character of the ground water supply, the water company investigate other local sources of water supply with a view of obtaining another supplementary source that will compare favorably with the present upland supply and be adequate for the present and future needs of the village.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the local board of health and to the Amenia Water Company, urging that the recommendations contained in the report be carried out.

AUSABLE FORKS

ALBANY, N. Y., *August* 7, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a recent investigation of the public water supply of the village of Ausable Forks.

Ausable Forks is an unincorporated village located partly in the county of Essex and partly in the county of Clinton. It is at the confluence of the east and west branches of the Ausable river, and is the terminus of the Ausable branch of the Delaware and Hudson Railroad, twenty-four miles southwest of the city of Plattsburg. The present population of the village is estimated at about 2,000.

The public water supply is derived by gravity from a stream rising in the uplands north of the village. The diverting dam is located about a mile northwest of the center of the village. There is little or no reserve storage capacity and fire protection is provided for by fire pumps in the pulp mill in the village. These pumps take their water supply from the Ausable river, and discharge directly into the village distributing system.

The distributing system consists of about 3 miles of water mains ranging from 2½ inches to 6 inches in diameter. The average pressure in the village is about 83 pounds per square inch.

The waterworks were built in the year 1896 by the J. & J. Rogers Co. of Ausable Forks. The works are at present owned and operated by this Company.

Practically all of the inhabitants of the village are served by the public system of water supply. There are about 300 service taps, none of which are metered. No gaugings are kept of the average daily consumption of water.

An inspection of the water supply was made May 24, 1912, by Mr. A. O. True, assistant engineer of this Department. The engineer was assisted and accompanied by Dr. L. J. L. Avery, the local health officer, and Mr. James Rogers of the J. & J. Rogers Co.

The water is taken from the stream at a low diverting dam at a point a few hundred feet above a fork in the highway. The water flows by gravity through a covered wooden flume from the intake to a circular wooden settling tank located in a small building a few hundred feet below the dam on the right bank of the stream. This tank is about 8 feet in diameter by 6 to 8 feet deep. The water is allowed to flow into this tank and is taken off from the top and conducted by a wooden flume to the pipe line to the village. In the winter season this settling tank is not used and the water passes directly into the intake.

The stream from which this water supply is derived rises in the hills about six miles north of Ausable Forks and flows south entering the Ausable river about a quarter of a mile below the village. The average width of the

watershed above the waterworks intake is about 1½ miles, a
is estimated at 7.4 square miles. Time did not permit of an i
watershed except in the immediate vicinity of the intake.
way paralleling the right bank of the stream and directly
are several houses. The land slopes moderately toward th
rear of these houses, which are distant from it about 300 t
eastern side of the watershed is thickly wooded and uninh
tance of three-quarters of a mile or more above the intake.
one-half miles above the intake there appears to be extens
through which the stream flows.

The results of the analyses of samples of this public water
at the State Hygienic Laboratory are given below.

REPORT OF WATER ANALYSIS FOR VILLAGE OF AU

Laboratory number	B-805 C-651
Source	Tap publ supply
Collected on	5/24
Color	
Turbidity	
Odor, cold	
Odor, hot	
Solids, total	
Loss on ignition	
Mineral residue	
Ammonia, free	.
Ammonia, albuminoid	
Nitrites	T
Nitrates	0
Oxygen consumed	1
Chlorine	0
Hardness, total	1
Alkalinity	1
Bacteria per c. c.	1,
B. coli type	10 2 + 1 1 1 + 2 0.1 0 + 3

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2
decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy;
musty; v, vegetable.

These results are not numerous enough to serve as a ba
clusions as to the sanitary quality of the water supply or a
of pollution which may at times obtain from the populatio
shed of the stream above the waterworks intake. The resu
ever, that this water is physically characteristic of uplan
section of the State and that it is subject to some anima
water is soft, low in total solids and, at the time the samp
high in color and low in turbidity. The chlorine value is
than normal. The values for nitrogenous organic matter
the distribution of organic nitrogen is not indicative of
activity in decomposition process such as usually takes
polluted water.

The bacteriological results are less satisfactory than the
The total number of bacteria are high even for an unfilter
and would indicate some pollution from animal organic mat
tion is further evidenced in the results for the examinati
for the B. coli type of fecal bacteria. These organisms we
out of six of the 1 c. c. samples tested. Without a more ex
tion of all parts of the watershed of this supply it is not
what part, if any, of this animal organic matter comes

therefore the more dangerous, sources. It may be largely traceable to the natural drainage of cultivated areas carrying manurial fertilizer or drainage from barnyards or other animal enclosures. Such matters, while ordinarily not as dangerous as pollution from human wastes, are objectionable and should be prevented, insofar as possible, from entering a public water supply. On the other hand, pollution from human sources may be infected and are a menace to a public water supply.

The results of the analyses are consistent with the conditions surrounding the collection of this water as far as could be determined in a necessarily brief inspection. The high color of the water is due to vegetable stain derived from the swamp land on the watershed. While the greater part of the watershed tributary to the public supply is woodland there is some population above the intake at no great distance from the streams. Undoubtedly some animal organic matter reaches the streams from these inhabited areas, some of which may be of human origin.

In view of the conditions under which this water supply is derived as outlined above I beg to submit the following conclusions:

1. That with the exception of the high color the public water supply of the village of Ausable Forks is of satisfactory physical and aesthetic quality.

2. That the sanitary quality of the water is at present injured by the resident population of the watershed.

3. That while there is probably no direct pollution of the water supply from human wastes opportunities for such pollution exist unless extreme care is exercised by those in control of the water works to prevent carelessness in the location of privies near the watercourses and the disposal of the contents of privies on the watershed.

In view of the above conclusions I would submit the following recommendations:

1. That a thorough inspection be made by the company controlling this public water supply of all parts of the watershed with a view of determining if any permanent, direct or dangerous pollution exists thereon.

2. That should any such pollution be found to exist that it be abated and if any difficulty be experienced in suppressing such pollution the company apply to this Department for the enactment of the rules and regulations for the sanitary protection of this water supply.

3. That frequent and regular inspection be made of the watershed of the village water supply to prevent any intermittent, careless or accidental pollution.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the local board of health.

CASTLETON

The findings of an inspection made subsequent to a conference between Dr. Wm. D. Shafer, health officer of Castleton, and the chief engineer, in which it was stated that the village supply was suspected of being polluted, are given in the following report.

ALBANY, N. Y., *June* 12, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a recent investigation of the public water supply of the village of Castleton.

Castleton is an incorporated village located in the southwestern part of Rensselaer county. It is on the left bank of the Hudson river and on the main

line of the New York Central and Hudson River Railroad, of the city of Albany. The present population is about 1,

The public water supply for the village is derived by gra Kill, a small stream rising in the low hills about 6½ mil lage and emptying into Hudson river just below the villag ing reservoir and intake are located on this stream at a miles east of Castleton and about 700 feet east of the B railroad tracks near South Schodack.

The distributing system consists of about 6 miles of cast ranging in size from 4 inches to 10 inches in diameter. T pressure in the village is about 90 lbs. per square inch.

The village water works were built in the year 1897 b They are at present owned and operated by the Common of New York city. Mr. William M. Imbrie is president o

About 70 per cent. of the population of the village is sa the public water supply. No gaugings are made or records age daily consumption of water by the village. No meter services.

The investigation of this water supply was made on Ju A. O. True, assistant engineer of the Department. The en panied and assisted by Dr. William D. Shafer, village hea formation concerning the supply was kindly furnished by M intendent of the water works.

Vlockie Kill, the stream from which this water supply i in the town of Schodack 3½ miles northeast of the impoun flows in an easterly direction to the Hudson river. The shed above the dam at the reservoir is estimated at about The total population on this watershed is estimated at watershed is intersected by about 12 miles of highways.

The reservoir is on the site of an old mill pond. It irregular contour, and is about 600 feet long and average width. It is said to be excavated to a depth of 10 feet. can be roughly estimated at 5,000,000 gallons. The present end of the reservoir is of masonry about 50 feet long and a spillway about 8 feet long. Just above the reservoir th area of low and swampy land.

The intake chamber is a masonry structure about 10 f near the shore on the southern or outlet end of the reservoi by a wooden superstructure connected with the shore by a three intake pipes extending a few feet beyond the intak girds on the bottom of the reservoir. The chamber is divi by a wall, the water passing from the first chamber to t two mesh screens about ¾ inch and ¼ inch mesh respect chamber is provided with a 20-inch overflow pipe discharg The cast-iron pipe line from this chamber to the village is eter.

Near the northern end of the reservoir there is a dwell ings. The house is about 80 feet from the water's edge. age therefrom would be intercepted by an uncompleted culv cut through the divide lying between this part of the reserv below the dam. At the time of inspection the outlet of t nel, which was presumably constructed to relieve the rese water coming down the stream, was checked by earth havi the cut at the lower end. Water was lying stagnant th of inspection.

Some little distance south of the house is located a p the watershed of the reservoir but only distant from th feet. On the southeastern side of the reservoir there is a tivated land sloping down to within 30 feet of the water. is a drainage line leading down to the reservoir near the line is a large tile pipe said to be laid with water tight jo tends several hundred feet up the drainage line to an open

the ground in the rear of several houses about a quarter of a mile south of the reservoir. The pipe follows around the margin of the reservoir and discharges below the dam.

There are no habitations near the stream for a distance of about a mile above the reservoir. A little over a mile above the reservoir the stream forks into two main branches. Just above this point at the junction of two highways there is a barnyard on the right bank just below the highway bridge. It is on a steep slope and extends to the water's edge. There were large accumulations of manure in this barnyard at the time of inspection.

Just above this point on both branches of the stream there are extensive cultivated areas extending to the water's edge. Several roads leading through the watershed were traveled but no houses were found near the main streams or their tributaries. A considerable area of the watershed is wooded.

The results of the analysis of samples of the public water supply of [illegible] are given in the following table. They are from the State Hygienic Laboratory and were made in the years 1909, 1910, 1911 and 1912 [illegible].

From these results it is seen that the water from this supply is variable in its physical characteristics and in the amount of mineral substances [illegible]. In hardness [illegible] vary from a water of moderate hardness to one which would be [illegible] very hard. The water appears to carry [illegible] able color at [illegible], and the turbidity varies from almost [illegible] comparatively [illegible] in one sample collected in the spring of the year of 50 parts per [illegible].

In the [illegible] organic content of the samples the figures for free ammonia [illegible] are [illegible] nitrogen as [illegible] ammonia are somewhat higher than [illegible] nitrates or [illegible] are relatively low. [illegible] the presence of [illegible] nitrogenous matter [illegible] tivity in the [illegible] of this water. [illegible] sumed [illegible] of the relative amount of [illegible] ural waters [illegible] by the vegeta[illegible] matter from [illegible] growth on the watershed.

[illegible]

I beg to submit [illegible]

[illegible]

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts Per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as —: Free ammonia	Nitrogen as —: Albuminoid ammonia	Nitrogen as —: Nitrites	Nitrogen as —: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+ = present, — = absent): 10 c.c.	1 c.c.	1-10 c.c.
....	Castleton......	Rensselaer....	Tap, public supply....	4/24/09	23	10	....	....	104	....	71	.008	.120	.001	0.20	4.20	1.87	62.9	42	550	+	+	—
....	Castleton......	Rensselaer....	Tap, public supply....	9/22/09	......	......	....	....	......	....	......	......	......	......	......	......	......	......	......	80	+	—	—
....	Castleton......	Rensselaer....	Tap, public supply....	12/10/10	10	20	....	....	257	....	243	.012	.050	.003	0.30	1.60	0.75	134	117	700	+	—	—
B-5659..	Castleton......	Rensselaer....	Tap, public supply....	8/ 4/11	......	......	....	....	......	....	......	......	......	......	......	......	......	......	......	590	3+0—	0+3—	0+3—
B-5817 C-3634	Castleton	Rensselaer....	Tap, public supply....	9/ 7/11	10	5	1 v.	1 v.	168	42	126	.001	.102	.001	Tr.	1.90	2.00	94.3	93	300	3+0—	3+0—	1+2—
B-6673 C-4346	Castleton	Rensselaer....	Tap, public supply....	12/21/11	16	1	1 v.	1 v.	133	33	100	.006	.058	.001	0.30	2.40	2.75	77.1	56	550	3+0—	1+2—	0+3—
B-7387 C-4973	Castleton	Rensselaer....	Tap, public supply....	3/14/12	20	50	1 v.	1 v.	61	23	36	.014	.140	.002	0.14	7.60	1.00	20.8	10	14,000	3+0—	1+2—	1+2—

of the water supply from human excrements and to reduce to a minimum the pollution of the water by organic matters from barnyards or other animal enclosures.

In view of these conclusions I beg to submit the following recommendations:

1. That the water company cause a thorough inspection to be made of all parts of the watershed of Vlockie Kill above the impounding reservoir, and that they abate any conditions causing a direct pollution of the streams tributary to the public water supply.
2. That the privy on the west side of the reservoir be removed to a more suitable location, with reference to any possible pollution of the water supply and at a greater distance from the reservoir.
3. That if possible the drain pipe draining the low ground to the south of the dam of the impounding reservoir be moved from the margin of the reservoir, or that iron pipe with tight joints be substituted for that part of the drain near the reservoir in order to prevent any possible pollution of the water supply from leakage in this line.
4. That if any difficulty be experienced in abating any insanitary conditions on the watershed, that the Commonwealth Water Co. apply to this Department for the enactment of rules and regulations for the sanitary protection of the public water supply.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the Commonwealth Water Company and to the local board of health, urging that the recommendations contained in the report be carried out.

CHAMPLAIN

ALBANY, N. Y., *June* 6, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation of the public water supply of the village of Champlain.

Champlain is an incorporated village located in the northeastern part of Clinton county four miles west of Lake Champlain and occupying both banks of the Big Chazy river. It is on the Rutland railroad. The present population is estimated at 1,400. The public water supply is obtained from the Big Chazy river at a point one and one-half miles above the center of the village. There is a dam across the river just above the bridge of the Rutland railroad formerly furnishing water power for mills a short distance below. The pumping station for the public water supply is located on the left bank of the river a few hundred feet below the dam and at the water's edge. The supply is pumped from the wheel pit of the pumping station, the water supply for the village and that furnishing power for the pumps being taken from one of the old power canals from the dam. The water is screened by the racks in the forebay of the canal.

The pumping station is a small but substantial and fireproof building with a brick superstructure having a lean-to roof. It is about 20 feet square and has a small wooden addition on the west side housing the gasoline auxiliary plant. The mechanical equipment consists in the main of a 36-inch vertical wheel connected to a pump of special design consisting of five horizontal reciprocating pumps placed symmetrically around and connected to a common crank on the wheel shaft and one Rumsey triplex pump geared to a 14 H. P. gas engine. The five cylinder pump lifts the water from the wheel pit through five separate screened suction pipes and discharges into a header

connected with the pipe line into the village. The auxilia
directly from the canal. It is said to be used only some
summer when the hydraulic power is insufficient. This is
pumpage and there are no reservoirs or stand pipes.

The distributing system is of cast-iron and consists o
pipes ranging from 4 inches to 8 inches in diameter. Th
maintained in the village is from 60 to 70 pounds per squa

The waterworks were built in 1897 by Lang & Goodli
Burlington, Vt. They are owned by the village, the wat
being leased. The works are under the direction of a wat
Mr. Oliver Lafountaine is president. Mr. John R. Wh
tendent of waterworks.

Practically all of the inhabitants of the village are se
water supply. There are about 280 service taps, none of
The average daily consumption is estimated at approximat

The investigation was made of the public water supply
1912, by Mr. A. O. True, assistant engineer of this Depar
mation concerning these waterworks was kindly furnis
Whiteside, superintendent, and Mr. James Chapman, the
of the pumping station.

Time did not permit of an extended investigation an
of the watershed of the Big Chazy river above the pumpi
ing water to the village of Champlain. An inspection w
of conditions at the pumping station and the surroun
above, the opportunities for pollution at the villages of M
Forks, and the river between Mooers and Mooers Forks.

The Big Chazy river rises in Chazy lake in the town o
flows in a northeasterly direction to the village of Mooer
is joined by the north branch of the Big Chazy river. T
rises in the mountains in the town of Ellenburg. From
river flows in a general easterly direction to Lake Champl
The area of the watershed above the pumping station at
mated at 260 square miles. The centers of population on
watershed are the hamlets of Altona, Ellenburg, Ellenbu
burg Depot, Perry Mills and Mooers Forks and the village
communities are located upon the river or its branches
population of about 3,500. The total population on this
shed is estimated at 8,500, that is, about 41 per cent.
is comprised in communities on or near the Big Chazy river
The total average population per square mile is approxim

Just above the pumping station the branches of the cana
water supply is taken, are twice crossed by the Rutland
tance of about 750 feet. Westerly from the pumping st
tracks border on the forebay for a distance of about 150 fe
this branch of the canal at a culvert. About 550 feet
tracks cross the other tributary of the canal about 50 feet
over the river and close to the headworks of the canal.
ditions it is seen that there is an opportunity at this
direct pollution of the public water supply by dangerous
passing trains or from carelessness on the part of those
track or bridges. A little over a mile above the pumpi
small community of Perry Mills, having a population of
hamlet was not visited. It is said to have no public or p
sewers. There is said to be some fouling of the river by

About 10.5 miles above the pumping station, as the r
incorporated village of Mooers. The present population
about 560. It has no public water supply or sewer syste
branch of the Delaware and Hudson railroad crosses the riv
on open floor plate girder bridge. A little over one-quarte
this railroad bridge on the left bank of the river is a dam,
mill. There is a privy vault located directly over the tail

Adjacent to the mill on the east the river bank is high and steep. At this point there was a dump at the time of inspection. Just east of this spot is a cemetery extending within an horizontal distance of 40 feet of the water's edge. About 1,000 feet east of above-mentioned mill is a 4-inch vitrified drain pipe discharging near the foot of a bank at a point about 150 feet from the river. About 50 feet further east is another and larger drain discharging onto low, swampy ground at a point about 200 feet from the river. This appeared to be an 8-inch pipe probably serving two or more families. Still further east about 175 feet is a 6-inch vitrified drain pipe from one or more houses laid across the flat ground to the river. There is also a privy built over and discharging upon the surface of this low, wet ground, though a considerable distance from the river.

Just east of the Delaware and Hudson railroad on the left bank of the river is a spur track. Between this and the railroad is a depression into which discharges a stone drain. About 80 feet east of the railroad still on the left river bank and some 40 feet from the water's edge on low ground were at the time of inspection the remains of a horse carcass. Two hundred and fifty feet east of the railroad and about 100 feet from the river was a dump, a carcass of a hog and the bones of a horse or other large animal.

On the left bank of the river 1¼ miles below the village of Mooers Forks is a camp ground with many small cottages for summer occupancy. No insanitary arrangements or permanent sources of pollution were noted in these grounds or along the river. At one place on the water's edge, however, some rubbish and bedding had been dumped near the water's edge. Immediately above the camp ground is a water power and excelsior mill. The privy vault for the mill is on the high, precipitous bank of the tailrace and not more than 45 feet horizontally from the water's edge. About ¾ of a mile east of the village of Mooers Forks the State road borders the edge of a precipitous bank along the river for a distance of nearly ¼ of a mile. Considerable road drainage passes directly into the river. No considerable or permanent sources of pollution were noted at Mooers Forks. Time did not permit of a further investigation of the watershed above Mooers Forks.

In addition to the railroad crossings already mentioned the Rutland railroad also crosses the Big Chazy river 2½ miles above Champlain pumping station and at Mooers Forks 11½ miles above the pumping station. The Rutland crosses the north branch Chazy river and tributaries several times above Mooers Forks at distances from 13 to 25 miles above the waterworks pumping station.

The results of analyses of samples of the public water supply of Champlain collected and analyzed by the State Hygienic Laboratory during the past three years are given, in parts per million, in the following table:

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as —: Free ammonia	Nitrogen as —: Albuminoid ammonia	Nitrogen as —: Nitrites	Nitrogen as —: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+ = present, — = absent): 10 c.c.	B. Coli Type: 1 c.c.	B. Coli Type: 1-10 c.c.
.....	Champlain....	Clinton......	Tap, public supply....	3/20/09	35	2	....	....	88	....	52	.112	.006	.004	0.40	7.15	1.50	39	27	4,600	+	+	+
B-4795	Champlain....	Clinton......	Tap, public supply....	3/ 2/10	8	Clear	....	....	80	....	50	.020	.050	.003	0.60	3.80	1 25	45.7	39.5	550	+	—	—
C-2847 B-5981	Champlain....	Clinton......	Tap, public supply....	3/ 8/11	5	Trace	1 v.	1 v.	75	21	54	.020	.142	.003	0.40	3.30	1.50	48.6	48	160	3+0—	1+2—	0+3—
C-3767 B-6314	Champlain....	Clinton......	Tap, public supply....	10/ 4/11	10	Trace	1 v.	1 v.	95	20	75	.004	.092	.001	Tr.	2.00	1.25	60	59	700	3+0—	1+2—	0+3—
C-4037 B-6728	Champlain....	Clinton......	Tap, public supply....	11/13/11	15	2	1 v.	1 v.	82	20	62	.010	.102	.001	0.10	4.90	1.50	60	45	160	3+0—	0+3—	0+3—
C-4398 B-7037 C-4663	Champlain....	Clinton......	Tap, public supply....	1/ 4/12	15	Trace	1 v.	1 v.	82	24	58	.022	.084	.001	0.80	4.10	1.00	52.9	28	[illegible]	[illegible]	[illegible]	[illegible]
B-[illegible]	Champlain[illegible]	[illegible]																					

These analyses would indicate that the Big Chazy river furnishes a moderately hard and clear water which is subject at times to considerable color. The samples contained a considerable amount of nitrogenous organic matter, which appeared for the most part in the form of albuminoid ammonia. Most of the values for free ammonia content are moderate and the nitrites are normal. The nitrates are fairly constant and relatively low. This distribution of nitrogen would not indicate any considerable activity in the nitrifying processes associated with heavily polluted waters. The chlorine content of all the samples is moderate and probably not much above the normal for this locality.

The total numbers of bacteria contained in these samples were in no case excessive for a surface supply from a relatively large watershed. This excepts the sample of March 29, 1909, which was evidently grossly polluted and not representative of the water ordinarily taken from the river. The results for the examination of the B. coli type of fecal bacteria are on the whole satisfactory. The samples of March 8, 1911, and October 4, 1911, however, show B. coli in as small test volumes as 1 c. c. and are probably indicative of pollution by animal excrements.

The sample of March 29, 1909, shows excessively high values in nearly all those chemical and bacteriological characteristics which indicate sewage pollution. The water was high in color but clear, high in free and albuminoid ammonia and oxygen consumed. The bacterial content was high and fecal bacteria of the B. coli type were found in all the volumes of the water tested.

These results are consistent with the conditions upon the watershed of the Big Chazy river above Champlain and the amount and character of the run-off of the river. The total population upon the watershed of the river above Champlain as already given is about 8,500. No gaugings are available as to the minimum rate of stream flow for the Big Chazy at Champlain, but by comparison with other similar streams for which gaugings have been made the mean minimum daily dry weather rate of flow can be estimated at 50 cubic feet per second. The relatively small amount of constant and permanent pollution of the river by the resident population above Champlain has but a small effect on the sanitary quality of the water as judged by chemical and bacteriological examinations.

The water is, however, at times undoubtedly polluted somewhat by the drainage from the concentrated population upon the river and its tributaries. There is also some danger from accidental and intermittent pollution from the railroad crossings and especially at those crossings just above the waterworks intake.

In view of the conditions, as shown by a necessarily brief inspection, under which the public water supply of Champlain is taken from the Big Chazy river, I beg to submit the following conclusions with respect to the sanitary conditions of the supply:

1. That the Big Chazy river at Champlain furnishes the village of Champlain with an adequate supply of water of reasonably good physical quality and variable sanitary quality.

2. That the river is polluted by the population resident upon the watershed and more particularly directly upon the river and its larger tributaries, though at the time that the majority of the samples were collected for analysis this pollution was somewhat masked by its large dilution in the river water.

3. That there are opportunities for direct, intermittent and dangerous pollution from railroad trains at points where the railroad crosses the watercourses above the pumping station.

4. That in view of the dangerous and direct character of pollution on the watershed, especially in the vicinity of the intake, and the absence of any natural purifying effect of storage, and notwithstanding that at times laboratory tests show the water to be of fair quality, there are other times when, as analyses show, this pollution is of such intensity as to make the supply unsafe to use for domestic purposes.

In view of these conclusions I submit the following re

1. That the board of water commissioners of t thorough study of the watershed of the Big Chazy plain with a view of determining the economy a removing all direct or dangerous sources of polluti water supply.

2. That should it prove practicable and in accor to reduce this pollution to a minimum that the v apply to this Department for the enaction of rules the sanitary protection of the watershed.

3. That should it be impracticable to entirely re pollution from this watershed, that the water be process of purification such as slow sand filtration methods of filtration.

4. That the present intake be changed so that derived from the northerly canal above the Rutland such a way as to avoid danger of pollution from the directly above the intake.

Respectfully submitt
THEODORE

Copies of this report were inclosed in letters addres water commissioners and to the local board of health urg mendations contained in the report be carried out.

CINCINNATUS

The following report contains the findings of an inspec to a request received from the local board of health, exp the quality of the water supply.

ALBANY, N. Y

EUGENE H. PORTER, M.D., *State Commissioner of Health,*

DEAR SIR: — I beg to submit the following report in the tigation of the public water supply of the village of Cinci

Cincinnatus is an unincorporated village located in th of Cortland county. It is the eastern terminus of the the D., L. & W. R. R. and is 19 miles from the city of Co both banks of the Otselic river. The present population

The public water supply is obtained from a number of a spur of the mountains 1¾ miles south of the village. apparently fed by an extensive area of ground water whi face along the foot of a steep shoulder of the hill about highway at a point ¾ of a mile directly north of Gee Br The water collected from these springs flows by gravity t system of distributing mains in the village. The surpl springs flows, by means of a cast-iron pipe connecting w system, to the circular uncovered concrete reservoir partl in excavation on the side of a hill about ¼ of a mile dir lage. This reservoir serves for storage and maintains a in the system of about 70 lbs. per square inch.

There are about 4½ miles of water mains ranging from in diameter, including the line from the springs. There a taps, none of which are metered. The water is supplied the springs being at an elevation of about 70 feet above t latter about 165 feet above the village.

The waterworks are owned by the municipality and we a water district being established in accordance with th

At the request of the town health officer, Joseph R. Grant, M.D., and at your direction an examination was made of the public water supply of the village of Cincinnatus on April 10, 1912. This examination was made by Mr. A. O. True, assistant engineer of this Department. The assistant engineer was accompanied and assisted in the inspection by Dr. Grant, the town hea officer, and he also conferred with Mr. B. R. Corning, president of the water board, and other town officials. No samples of water were collected for analyses at this time. The results of the analyses of samples made at the State Hygienic Laboratory are given below.

REPORT OF WATER ANALYSIS FOR VILLAGE OF CINCINNATUS

Laboratory number	....	B-6602 C-4282
Source	Tap public supply	Tap public supply
Collected on	10/5/10	12/12/11
Color	2	1
Turbidity	Clear	Trace
Odor, cold		1 v.
Odor, hot	....	1 v.
Solids, total	85	71
Loss on ignition	17	13
Mineral residue	68	58
Ammonia, free	.018	.020
Ammonia, albuminoid	.040	.012
Nitrites	.001	.002
Nitrates	.360	1.50
Oxygen consumed	.20	0.82
Chlorine	1.00	1.75
Hardness, total	55.7	39
Alkalinity	54	37
Bacteria per c. c.	360	1,100
B. coli type	10 c.c. + 1 c.c. + 0.1 c.c. —	10 c.c. 3 + 0 — 1 c.c. 3 + 0 — 0.1 c.c. 2 + 1 —

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

These analytical results are not numerous enough to serve as a basis by which to judge of the character of the water at all times. However, from an examination of the results, as given, it would appear that this water supply is physically only moderately hard and is free from any appreciable turbidity and color. Chemically it is somewhat higher in chlorine than normal and contains a relatively small amount of unoxidized nitrogenous organic matter, and bacteriologically showing a high total number of bacteria and the presence of a considerable number of fecal bacteria of B. coli type. In the light of conditions at the sources of the public water supply to be mentioned later the analyses would indicate that this water is probably of excellent physical and sanitary quality above the zone of pollution, to be described.

Several opportunities for pollution of this water supply were noted at the springs. At the most westerly spring the water is directed into a concrete catch basin by means of a concrete bulkhead, with a wing wall, 25 feet long and several feet deep located at the foot of a steep shoulder of the hill as already mentioned. The catch basin has no masonry or water tight bottom and the lower part of the up-hill wall is of open rubble masonry. Above the basin about 30 feet distant is one of many poultry houses upon the premises of an adjacent farm house. Up the hill from the farm house is a field which receives manurial fertilizer. The catch basin is flush with the ground surface on the upper side and the open top is protected only by loose concrete slabs laid across the walls. In addition to the opportunity for pollution by animal

organic matter passing directly into the supply in the b
considerable pollution of the ground water above the l
of the storm water, which after passing over the pollu
above, sinks into the subsoil of disintegrated shale and
basin with little or no natural purifying action having
From the westerly catch basin the water is led by a
catch basin some 200 feet to the northeast of the first
have been laid as to drain water along its entire lengt
small holes were made in it at frequent intervals. T
a disintegrated shaly rock which was taken out and p
a blind drain. At one point along this trench and ab
privy belonging to the premises.

Some 4 pipes discharge water from the springs into
basin. The most northerly of these pipes is 125 feet
most part under a chicken yard. This pipe is said
joints. The other springs were a short distance nor
catch basin. One of them has a concrete pit but the
surface of the ground. This pit and also the tops
covered with loose slabs. The northeast catch basin
surface for some 10 inches and it is said to be prov
tom. On the hill side between the two catch basin
there are about 6 poultry houses in addition to th
mentioned. From the northeast catch basin the wa
main to the village distributing system. Some 50
building and enclosures adjacent to the springs.

The reservoir is 50 feet in diameter and 12 feet d
000 gallons of water or probably 3 or 4 days' supp
rounded with a woven wire fence to prevent the acc
The embankment around the walls is sufficient to
entering the reservoir. The region adjacent to a
uninhabited.

From a consideration of the results of this inve
the following conclusions in regard to this public w

1. That this water supply derived from num
data is at hand as to the quantity available f
be of satisfactory sanitary quality above the
above.

2. That the sanitary quality of the water
tion from manured fields and poultry houses
from the farm house privy and from some
matter incidental to the occupation by men a
adjacent to the springs.

3. That while there has probably been no i
supply by human pollution the conditions a
ford ample opportunity for infection in the
on the premises near the springs, and are
health of the inhabitants of the village.

In view of these conditions I would make the

1. That should the board of water comm
source of public water supply that the dang
be prevented by,

a. Elimination of all the sources of
as indicated in the above report, or th
from the springs as to preclude any p

b. Construction of trenches of ample
the hill above the springs at such a p
the flow of storm water over the spri
the catch basins.

c. Raising the masonry of the catch
18 inches above the surface of the gro
water tight but properly ventilated co

2. That should these improvements prove uneconomical or impracticable the board of water commissioners seek another source of public water supply which shall be free from the danger of direct or accidental pollution and adequate in quantity for the future needs of the village.

3. That regular and frequent inspections be made by those in charge, of all parts of the waterworks to prevent accidental or wilful pollution of the water supply.

Respectfully submitted,
THEODORE HORTON
Chief Engineer

Copies of this report were inclosed in letters addressed to the local board of health and to the board of water commissioners urging that the recommendations contained in the report be carried out.

CORINTH

Suspicion having been aroused in regard to the Corinth public water supply through correspondence received by this Department, an inspection was made on July 12, 1912. The following report contains the findings of this inspection.

ALBANY, N. Y., *July* 25, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a recent investigation of the public water supply of the village of Corinth.

Corinth is an incorporated village located in the northern part of Saratoga county. It is on the right bank of the Hudson river at a point where the river bends sharply to the eastward. The village is on the Saratoga and North Creek branch of the Delaware and Hudson railroad 17 miles north of Saratoga Springs. The present population is estimated at about 2,500.

The public water supply of the village of Corinth is obtained from a stream rising on the mountain about two miles west of the village. This stream flows easterly into the Hudson river where it forms the northern boundary line of the corporate limits of the village. There are two reservoirs on this stream, the upper and larger being an impounding and storage reservoir and the lower one a storage and distributing reservoir. The water flows by gravity to the village from the lower reservoir, after having passed through a small gravity coke filter.

Because of the dry season of the past two years and the increased demands for water it has been necessary to supplement this supply by pumping water into the village main from Sturdevant creek. This stream rises some four miles south of Corinth and flows northerly through the center of the village, emptying into the Hudson river. The pumping station is located on the right bank of this stream in the village at a point near where it is crossed by a trestle carrying a spur track from the D. & H. railroad. There is an old mill pond at this point. The intake is about 1,000 feet upstream from this pumping station. The area of the watershed of Kendall creek above the lower reservoir is about 1¾ square miles, and that of Sturdevant creek above the present intake is about 10½ square miles.

The distributing system consists of about 10 miles of water mains from 1½ inches to 8 inches in diameter. The average water pressure in the village is about 80 pounds per square inch.

The waterworks are owned by the village and are under the direction of a board of water commissioners, of which Mr. W. J. Burnham, president of the village, is chairman. Mr. H. S. Andrews is superintendent of the waterworks.

About 80 per cent. of the inhabitants of the village are served by the public water supply. There are about 450 service taps, none of which are

metered. No figures are directly available for the avera
of water.

The investigation of the water supply at Corinth w
1912, by Mr. A. O. True, assistant engineer of this
gineer was accompanied and assisted in his inspection c
A. Smith, health officer of the village, Mr. J. W. S
village board of health, Mr. W. C. Randall, commissio
S. A. Parmenter, health officer of the town of Corinth.

The regular upland supply is impounded from a com
shed near the headwaters of a mountain stream kn
The upper reservoir is an artificial pond formed b
bottom and diking along the eastern or lower borde
covers about two acres and is about 15 feet deep in
northern end is shallow. It has an estimated capaci
The water flows from the upper to the lower reservoi
bed of the creek.

The watershed tributary to this reservoir is alm
practically uninhabited. A few head of cattle are p
slopes. Along the stream between the upper and
have access to the stream and there were accumulat
water at time of inspection. This constitutes a vi
rules and regulations enacted by this Department fo
of the public supply of Corinth. The elevation of
775 feet above sea level.

The lower or distributing reservoir is about a qu
upper reservoir. It lies just south of the highwa
below a fork in the highway. The reservoir is in e
feet long and 100 feet wide, formed by a rubble n
row gorge. The dam has a spillway about 20 fee
an average depth of about 5 feet and an estimated
750,000 gallons. It is about 730 feet above sea lev
of the dam there is a small building with masonry
housed the coke filter and the intake and blow-of
the chamber in the building through a vertical op
bar screen. It passes through two 4-inch pipe i
masonry chamber 7 feet square containing from
coke. After passing through this chamber it is t
the coke at the opposite end and enters a sec
whence it flows by gravity to the village. By n
the bottom of the reservoir to a diverting dam ju
can be taken directly from the stream. The ma
with blow-off pipes so that they can be drawn off

A few hundred feet above this reservoir the r
north skirting the eastern edge of the watershe
ing through the southeastern part of the water
at the fork of the highway. One of these hous
highway, the rear of the premises bordering on
surface privy on the premises about 30 feet fro
unused, but it contained accumulations of exc
time of inspection. This is a violation of Rule
watertight concrete vault on the same premis
the creek. This was built under advisement of
complies with the rules and regulations, prov
condition prevented from overflow, and the c
vided for in the rules. At the time of the i
full of liquid wastes and there appeared to b
place unless it was promptly emptied.

Just west of the fork of the roads there
privy vault about 100 ft. from the stream. A
said that this was to be torn down and a ne
from the stream. The present privy is a vi

There are no habitations on the watershed near the upper reservoir. The watershed to the northwest, west and southwest of this reservoir in uninhabited, mountainous and largely wooded.

An inspection was made in September, 1910, of the watershed of Kendall creek by Mr. John M. Sill, special sanitary inspector of this Department with reference to the existence of violations of the rules and regulations. The violations reported by the inspector were found abated at the time of the inspection by the assistant engineer on July 12, 1912.

The intake on Sturdevant creek, which stream has been used during the dry seasons of the past three years at which time it apparently furnishes practically all the supply used, is an open wooded rectangular crib with double walls carried below the bed of the stream. The space between the walls is filled with coarse coke to a point above the water level. The water enters a 6-inch elbow protected by two screens, one of ¼-inch mesh and the second of wire window screen. The 6-inch line from the intake is laid on top of the creek bed to the pumping station.

The pumping station is a small wooden structure near the stream. The pump is a 3-stage 4-inch centrifugal pump directly connected to an electric motor. The pump operates against a dynamic head of about 115 pounds per square inch. There is evidently considerable head lost in the temporary 4-inch discharge line because of several short radius quarter bends at no great distance from the pump. The static head at the station is said to be 80 pounds per square inch.

Sturdevant creek rises near South Corinth about 4 miles southwest of the village of Corinth. The stream has a very flat profile falling not more than 50 feet in three miles above the village. The largest tributary, however, entering the creek from the west 1½ miles above the village, rises on the mountains 1,200 feet above the village. With the exception of a small part of the extreme southern part of the village there is but a very small population on the watershed of the stream above the intake. It is estimated at from 75 to 100 people. No direct opportunities for pollution of the water supply were found near the intake. There is a considerable depth of water in the stream along this reach and it was used for swimming by boys. They are said to have been warned away, however, and a sign has been placed on the bank prohibiting bathing or any pollution of the stream.

The houses in the village already mentioned as being on the watershed above the intake are near the divide on flat ground and 1,000 to 2,000 feet from the stream. There are no buildings within a quarter of a mile of the creek for a distance of one and one-quarter miles above the village corporation line. At that distance there is a highway crossing the stream and a dwelling on high ground near the stream. The privy for these premises is provided with a removable wooden container, which appeared to be, in a leaky condition. It was located about 150 feet from a gully sloping steeply to the creek. There was an animal enclosure at the edge of the same gully, and horses and cattle use the latter as a thoroughfare in going to the creek to drink.

The Delaware and Hudson Railroad crosses Sturdevant creek or its branches several times between the stations of South Corinth and Corinth.

The results of analyses of samples of this public water s
January, March and July of this year are given in the foll

Laboratory number	B-6980 C-4612	B-7378 C-4967	B-8221	B-8 ...
Source	Tap public supply	Tap public supply	Tap public supply	Upp reserv Kend cree
Collected on	1/31/12	3/13/12	7/12/12	7/12
Color	Trace	15	......	....
Turbidity	Clear	Clear	......	....
Odor, cold	1 v.	1 v.	......	....
Odor, hot	1 v.	1 v.	......	....
Solids, total	31	31	......	....
Loss on ignition	13	7	......	....
Mineral residue	16	24	......	....
Ammonia, free	.020	.048	......	....
Ammonia, albuminoid	.028	.062	......	....
Nitrites	.001	Trace	......	....
Nitrates	0.14	0.14	......	....
Oxygen consumed	1.80	1.20	......	....
Chlorine	0.25	0.25	......	....
Hardness, total	18.9	20.8	......	....
Alkalinity	9.0	12.0	......	....
Bacteria per c.c.	80	210	450	
B. coli type	10 c.c. 1+2— 1 c.c. 0+3— 0.1 c.c. 0+3—	10 c.c. 0+3— 1 c.c. 0+3— 0.1 c.c. 0+3—	10 c.c. 3+0— 1 c.c. 1+2— 0.1 c.c. 0+3—	10 3+ 1 1+ 0.1 0-

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy musty; v, vegetable.

The water of Sturdevant and Kendall creeks carries a moderate amount of hardness. They would appear from subject at times to considerable color though free fron turbidity. The content of nitrogenous organic matter a total nitrogen is low to moderate. The nitrogen as free ar in the tap samples of January 31, 1912, and March 13, 1! samples from Sturdevant creek and the lower reservoir The highest values for albuminoid ammonia are little m The nitrites are low, and the mineral nitrogen as nitrates largest values for chlorine are but little higher than nor
The bacteriological analyses are somewhat variable. bacteria are not high except in the samples of July 12, and the July 12, 1912, sample from Sturdevant creek. counts are somewhat high for a potable surface impoun good sanitary condition. The examinations for the B. organisms indicate in general a freedom from excessiv organisms. Two of the samples, however, gave positive type is one of the 1 c. c. volumes tested. This is strong by animal organic matter of the water at the time the sa
In summarization I would submit the following conclu sanitary condition of the public water supply of the vill

1. That the watersheds of the streams now being public water supply for the village are capable of quate supply of water of good physical and aesth present and future needs of the village.
2. That the sanitary quality of the water from though analyses have indicated that it has been fair is subject to more or less pollution by drainage fro cattle or other domestic animals, and at a few p organic wastes of human origin.

In view of these conclusions I submit the following recommendations:

1. That all violations of the rules and regulations for the sanitary protection of the water supply from Kendall creek be abated by the Water Commissioners of the village of Corinth in accordance with sections 70, 71 and 73 of the Public Health Law.

2. That should it be the intention of the water commissioners to continue to use Sturdevant creek as a source of public water supply that they apply to this Department for an amendment of the rules and regulations which will establish sanitary protection for the waters of this stream.

3. That the board of water commissioners cause an inspection to be made of all premises upon the watersheds of all streams furnishing water for the public water supply for Corinth for the purpose of ascertaining and abating all possible sources of pollution of such water.

4. That should Sturdevant creek be retained as a source of supply that steps be taken to prevent any intermittent pollution from the toilet rooms of trains entering the water supply at points where the railroad crosses the streams or along the embankments.

5. That should it be found impracticable or not in accordance with economy to eliminate the pollution of Sturdevant creek by those passing over the railroad or by any other source of pollution that the supply from this stream be subjected to some efficient or approved process of filtration, or that the intake be moved to a point west of and above the railroad tracks.

6. That frequent and thorough inspections be made by the water company of all parts of the watersheds from which any of the public water supply is obtained.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the local board of health, urging that steps be taken to carry out the recommendations contained in the report.

DELEVAN (Town of Yorkshire)

The following report contains the findings of an inspection made subsequent to a request from the Delevan Water Co. through the local health officer that such inspection be made.

ALBANY, N. Y., *November* 21, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a recent investigation made by this Department of the public water supply furnished by the Delevan Water Co. to the village of Delevan.

Delevan is an unincorporated village in the town of Yorkshire and is located in the northeastern part of Cattaraugus county on the Buffalo division of the Pennsylvania railroad, 39 miles southeast of the city of Buffalo. It has an estimated population of 600.

The public water supply for this community is derived from a number ot springs issuing along the foot of a steep slope in the valley of a small stream located about one mile west of the village. The water from the springs is conducted by means of numerous blind drains to a small masonry settling basin some 100 feet or so below the springs from whence it passes to a masonry intake basin. The intake basin is a few feet from and just below the settling basin and is protected by a small wooden building. From this intake basin the water passes to the village by gravity in a cast-iron pipe line. On the opposite bank of the stream from the springs there is a small rubble

masonry equalizing and storage reservoir which is situated : elevation than the above-mentioned intake basin. This reser directly with the cast-iron pipe line to the village and at t draft the water supply going to the village is drawn directly and any excess water at times of small draft would flow in reservoir. The reservoir is 9 feet by 15 feet in plan and therefore has a capacity of 10,000 gallons. The walls ex above the ground level. They are thickly cemented on the in and protected by a suitably ventilated wooden building.

In addition to the regular supply from the springs as there is also provided an emergency supply from the stre can be taken from a small shallow reservoir or pond whicl low masonry dam across the stream a few hundred feet abc reservoir and springs. The water is conveyed from the da wrought-iron pipe laid along the bed of the stream to the voir. Ordinarily the valve of this line is kept tightly clo intention of the water company to use this supply only i other emergency.

The distributing system consists of approximately two pipe, with a small amount of wrought-iron pipe, 4 inches diameter. The average water pressure in the mains in th 60 lbs. to the square inch.

These waterworks were built in the year 1891 and 189 Water Company by whom they are at present owned and W. Read, of Delevan, is president of this company and Mr. G of Delevan, is superintendent of the waterworks.

Approximately ⅔ of the population of the village is ser water supply. There are no gaugings or other data from the average daily consumption of water. There are about none of which are metered.

The investigation of this supply was made at the request pany on November 7, 1912. This investigation was made t neer A. O. True who was accompanied and assisted by Mr. superintendent, and Mr. Bush, one of the members of the

Above the dam at which the emergency supply can be tak a watershed of about 250 acres. The watershed is a narro about ⅜ of a mile in width and about ½ to ¾ of a mile are no habitations upon this watershed, the area consistir land and partly of pasture land. There is said to be 20 t pastured on both banks of the creek. At certain points t to the stream are precipitous and as they are composed admixture of clay there would undoubtedly be a fouling of pended matter washed into the stream during heavy rains

There are no habitations or buildings of any kind above of the springs. The ground directly above the springs which is part of the pasture land already mentioned. The upon land owned by the water company are separated fr a fence and while cattle would not ordinarily have acce immediate area from which they issue, there is some opp pollution from the surface water coming from the steep sl during times of heavy rainfall.

Analyses of the samples of water collected by the Sta atory in the past three years together with the results of samples collected at the time of the inspection are give table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)												BACTERIOLOGICAL			
					Color	Turbidity	Odor		Solids			Nitrogen as—				Oxygen consumed	Chlorine	Hardness		Bacteria per c.c.	B. Coli Type (+ = present, — = absent)		
							Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates			Total	Alkalinity		10 c.c.	1 c.c.	1-10 c.c.
....	Delevan......	Cattaraugus...	Tap on public supply...	5/26/10	Tr.	Cl.	....	....	169	...	138	.006	.056	.002	0.30	0.75	1.25	117	117	10	—	—	—
....	Delevan......	Cattaraugus..	Tap on public supply...	10/13/10	Tr.	Cl.	....	....	145	...	120	.006	.023	.00[illegible]	0.30	0.60	0.75	120	120	800	+	—	—
B-4758 C-2811	Delevan......	Cattaraugus...	Tap on public supply...	2/27/11	Tr.	Cl.	1 v.	1 v.	154	21	131	.010	.020	.00[illegible]	0.40	0.40	0.75	126	122	40	1+2—	0+3—	0+3—*
B-6564 C-4241	Delevan......	Cattaraugus...	Tap on public supply...	12/ 8/11	Tr.	Cl.	1 v.	1 v.	158	11	147	.014	.012	.001	0.40	1.10	0.50	181	123	30	—	—	—*
B-7218 C-4825	Delevan......	Cattaraugus...	Tap on public supply...	2/24/12	Tr.	Cl.	1 v.	1 v.	186	15	171	.010	.028	Tr.	0.52	1.40	1.00	120	118	170	1+2—	0+3—	0+3—*
B 7673 C 5214	Delevan......	Cattaraugus...	Tap on public supply ..	4/ 9/12	Tr.	Cl.	1 v.	1 v.	150	23	127	.002	.024	.001	0.48	0.30	0.75	120	115	110	1+2—	0+3—	0+3—*
B 8655 C-5885	Delevan......	Cattaraugus...	Tap on public supply...	9/24/12	Tr.	Cl.	1 v.	1 v.	147	14	133	.004	.004	Tr.	0.60	0.30	0.75	126	121	3,000	—	—	—*
B 9063	Delevan......	Cattaraugus...	Tap on public supply...	11/ 7/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	53,000	2+1—	1+2—	0+3—†
B-9051 C-6236	Delevan......	Cattaraugus...	Catch basin at springs..	11/ 7/12	Tr.	Tr.	1 v.	1 v.	148	12	136	.005	.018	.001	0.70	1.40	0.50	126	121	48,500	1+2—	0+3—	0+3—†
B-9062..	Delevan......	Cattaraugus...	Overflow of dam, emergency supply........	11/ 7/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	14,000	3+0—	3+0—	0+3—†

* More than twenty-four hours in transit to laboratory. † Four days in transit to laboratory.

All these samples for complete analysis were fr
or turbidity — which would be expected in a spr
tected from any large amount of surface water c
in contact with decaying vegetation. All the sp
very uniform hardness of roughly 125 parts per
supply is subject to very little dilution from rai
would be classed as a hard water. The results wo
ordinarily contained but a moderate amount of
as free ammonia and albuminoid ammonia. The
are low to moderate and would indicate, in con
amount of nitrogenous organic matter and nitrate
but a small amount of organic matters. The chl
higher than normal, but in the majority of sample
a part per million in excess of normal.

The bacteriological results are somewhat vari
majority of the samples for bacteriological analy
transit to the laboratory and those collected at t
four days old before being analyzed. The total co
are probably not representative of the bacterial c
time of sampling. Excluding these samples the t
not appear to be excessive except possibly in the s
13, 1910, which showed a count of 800 per c. c.
type of fecal organisms, which probably were not
any increase in these organisms, would indicate a s
supply by animal organic matter probably at the
sample collected at the time of inspection showed t
in as small test volumes as 1 c. c. There had be
preceding 12 hours. The sample of the emergenc
showed considerable of the B. coli type of bacteria
surface water from the pasture land on either bank

From a consideration of the results of the anal
supply together with the data obtained by the ins
I would submit the following conclusions:

1. That the public water supply furnished t
van Water Company from upland springs, th
satisfactory physical and chemical quality.

2. That ordinarily the water directly from
in the stream at the emergency intake is free
ters of human origin, but that both these sou
by the surface flow upon lands used for pastur

3. That the present equalizing reservoir do
storage capacity for fire or other emergency an
ation of the emergency supply from the creek w
tain by reason of the inaccessibility of the work

In view of these conclusions I beg to submit th
tions:

1. That the springs constituting the regular
lage be protected from any surface wash from
heavy rains or from the melting of snow, by the
side above the springs of a trench or trenches
width as to effectively intercept surface waters a
below the intake.

2. That the water from the emergency creek
diately available for fire purposes at all times
line from the creek dam directly with the equaliz
providing it with a float valve in the equalizing
ner that the creek water would be shut off except
times as there is a large draft on the system fro

Respectfully submitted,
THEO

Copies of this report were inclosed in letters add
Water Company and to the local board of health.

ELLICOTTVILLE

ALBANY, N. Y., *November* 26, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on a recent investigation of the public water supply furnished to the village of Ellicottville by the Ellicottville Water Co.

Ellicottville is an incorporated village located in the central part of Cattaraugus county on the Buffalo, Rochester and Pittsburg Railroad, about fifty miles south of the city of Buffalo. The present population is estimated at 1,100.

The public water supply for the village is derived partly by gravity from two groups of springs and two flowing wells on the hills, about one mile west of the village, and partly by pumping from six driven wells, located on the left bank of the creek in the village. The latter supply is a supplementary supply and is used at only such seasons as the gravity supplies are inadequate.

The springs constituting the original source of supply for the village are known as the Niles springs. They are located one mile west of the village and several hundred feet north of the highway. The water from these springs is conveyed by gravity to a reservoir, located on the side of a hill, about three-quarters of a mile west of the village. This spring is said to have been inadequate to supply the village and very soon had to be supplemented by an additional supply derived from a group of springs, located about the same distance west of the village, but on the opposite side of the highway. This source is known as the Marsh springs. Later two flowing wells were developed on the right bank of a small stream below the Niles springs. It is understood that the water from the Marsh springs and flowing wells is conducted directly to the village in a wooden pipe line. Near the Marsh springs an emergency supply is to be used only in case of an accident to the pumping station, during a shortage of water or similar extraordinary emergency.

The distribution and equalizing reservoir is of earth construction, partly in cut and partly in fill, and is located on the southerly side of a hill, north of the highway, and about three-quarters of a mile west of the village. It is an open reservoir about 85 feet square and 10 feet deep and has a capacity of about 200,000 gallons. The inside slopes are riprapped. Any excess water when the reservoir is full passes out through an overflow pipe near the northeast corner and is discharged into a ditch below the embankment. The pipe line from the reservoir is connected with the village distributing system and with the line from the Marsh springs and flowing wells at a point on the west side of the village. During ordinary operation this pipe line from the reservoir is shut off by a gate at its junction with the village or else so throttled down that the pressure in the distributing system is only that which obtains from the Marsh springs and flowing wells, which are situated at a considerable lower elevation than either the Niles springs or reservoir. At times of fire or emergency the full head of water is obtained from the reservoir by opening the valve on the reservoir pipe line and closing the valves on the line from the Marsh springs and flowing wells, all these valves being located near the junction point.

During the dry season water is pumped from a battery of six driven wells, located near the left bank of the creek flowing through the village. These wells are about 26 feet deep and the water is pumped directly into the mains by a small duplex steam pump, located in a masonry pit some 6 feet below the ground level. The pumping equipment, together with a twenty H. P. boiler, is housed in a small wooden building.

The distributing system consists of about 3½ miles of pipe mains, ranging from 2 inches to 8 inches in diameter. These pipes are said to be of both the wooden staves and bored wood types, with a small percentage of iron pipe. The water pressure in the village is ordinarily thirty-five to forty-five pounds per square inch. This can be increased to eighty pounds per square inch by the full head of water from the reservoir.

These works were built in 1889 by the Ellicott they are at present owned and operated. Mr. C. president of this company and Mr. F. E. Bartley works.

The Department having been informed that the of typhoid fever in the village during the year, a at your order on October 23, 1912, of conditions in to this prevalence of typhoid by Dr. Edward Cla Department. Dr. Clark's report was submitted to 25, 1912. In this report he states that during 1 six cases of typhoid fever in the village of Ellicot mild cases occurring in January, one in August, the time of the report. In his opinion several of edly imported. From this report there appears to stances in connection with the milk supply of the water supply Dr. Clark noted that each of several or four weeks after the occurrence of fires in the vi the filling of the mains of the distributing system w voir. He advised that an analysis of the water su ascertain, if possible, if the occurrence of typhoi connected with the public water supply of the villa

On November 12, 1912, an investigation of the pu village was made by A. O. True, assistant engineer samples of the water for analysis were collected at engineer was accompanied and assisted by Mr. H. E. board of health of the village, and by Dr. W. B. Joh town of Ellicottville.

The small creek in which the emergency intake ha watershed of about one-half a mile square. It flov and woodland and there are some four or five hous near the stream or its branches. A portion of the extensive pasture land, and there is considerable o of the water by animal organic matter being washed rains. As there is said to be some eighty head of above the intake, there is also considerable opportu barn yards and animal enclosures into the stream. this intake is a dwelling house near the left bank of vault of the building is directly on the bank of the s the high water mark only about 18 feet.

The Marsh springs issue from some six outlets at the pasture land near the intake in the creek. Th these springs to a common catch basin, from which village in a wooden pipe line. Each spring is curbed curbs are constructed of vertical planking, and in joints have opened by the shrinking of the wood and protection from surface water from the pasture land spring water supply.

The Niles springs are located upon the hillside a small superstructure. There are no dwellings or oth in the vicinity of these springs. There are no dwellin sources of pollution in the vicinity of the two flowin the Niles springs.

At the reservoir the hill rises sharply on the northe shed is uninhabited. There is a pasture about 400 o above the reservoir. Just north of the reservoir and there is a field which had been manured at the time of face water coming from this hillside is cared for by the northern side of the embankment. This ditch is and at the time of inspection surface water was runn at the northwest corner. It was said by some of the board of health that considerable trouble had been exp

by turbidity at certain seasons. There was also some complaint that eels and small fish had been drawn from the system through the service pipes. It was stated by the engineer at the pumping station that the mains had been flushed through the hydrants on an average of every six or eight weeks.

One new case of typhoid fever was reported on October 25, 1912.

The results of analysis of samples of water collected by the State Hygienic Laboratory, together with those collected at the time of inspection, are given in the accompanying table.

REPORT OF WATER ANALYSES FOR VILLAGE OF ELLICOTTVILLE

Laboratory number	....	B-4767 C-2823	B-6238 C-3975	B-2018 C-6198	B-9019 C-6197	B-9017 C-6202
Source	Tap public supply	Tap public supply	Tap public supply	Catch basin Marsh spring	Reservoir at overflow	Wells in village
Collected on	5/27/10	3/1/11	11/2/11	11/6/12	11/6/12	11/6/12
Color	2	5	10	Trace	Trace	Trace
Turbidity	12	2	5	Trace	Trace	Clear
Odor, cold	......	2 v.	1 v.	1 v.	1 v.	1 v.
Odor, hot	......	2 v.	1 v.	1 v.	1 v.	1 v.
Solids, total	72	51	61	31	56	134
Loss on ignition	......	20	9	9	13	15
Mineral residue	65	31	52	22	43	119
Ammonia, free	.002	.004	.010	.014	.014	.014
Ammonia, albuminoid	.052	.076	.014	.048	.052	.020
Nitrites	.001	.001	.001	.001	.001	.001
Nitrates	0.10	0.40	0.14	0.20	0.60	0.80
Oxygen consumed	1.10	1.10	1.00	1.40	0.90	0.10
Chlorine	1.00	2.25	1.25	0.50	0.50	2.25
Hardness, total	36.4	28.8	29.9	12.7	32.5	103
Alkalinity	33	24	18	8	24	101
Bacteria per c.c.	17,500	425	500	1,900	130	10
B. coli type	10 c.c. + 1 c.c. + 0.1 c.c. +	10 c.c. 3+0— 1 c.c. 1+2— 0.1 c.c. 0+3—	10 c.c. 3+0— 1 c.c. 2+1— 0.1 c.c. 1+2—	10 c.c. 3+0— 1 c.c. 2+1— 0.1 c.c. 0+3—	10 c.c. 0+3— 1 c.c. 0+3— 0.1 c.c. 0+3—	10 c.c. 0+3— 1 c.c. 0+3— 0.1 c.c. 0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

The analysis of samples taken from taps on the distributing system in the village, which should be fairly representative of the character of the water supply at the time of sampling, are too few in number to serve as a basis to judge of the physical, chemical and bacteriological character of the water at all times. The water may come from one or from several ground water sources. The analyses of the samples from these different sources would indicate that the water from the springs was relatively soft, while that from the driven wells in the village would be classed as a hard water. There are no separate analyses of the flowing wells, but since the several analyses of the tap supplies show but a moderate hardness, and since a considerable part of the supply from gravity sources probably comes from these wells, it is likely that the water from this source is of moderate hardness and similar to the other upland sources. The tap samples show a moderate amount of color and turbidity, but those collected at the sources of supply were practically free from these characteristics. This is probably due to slight accumulation of sediment in the distributing mains. The amounts of nitrogenous organic matter as free ammonia are somewhat more than moderate for a ground water in the best sanitary condition. The values for albuminoid ammonia, however, are moderate in all the samples. The chlorine content of all samples is higher than normal, and those samples from the wells in the village, and from a tap on the public supply collected on March 1, 1911, are about two parts per million higher than the probable normal

for this locality. It would be expected that the w in the village would show high chlorine, as they district in which cesspools are used, and the grou organic wastes, even though purified by passage retain the chlorine, a mineral element universall ments. The fluctuations in the chlorine content o ably due in part to the effects of intermittent poll by surface waters from the surrounding pasture la

The results of the bacteriological analyses are counts of bacteria in the tap samples are somewhat supply. Those of the March 1, 1911, and Novem only moderately high, but that of the May 27, 1910, high count. The count of the sample at the Marsh s high for a ground water in good sanitary condition. the reservoir and from the driven wells show a re factory bacterial content. Except in the samples co voir and the driven wells in the village the results type of organisms are unsatisfactory. While none o were isolated from any of the test, volumes of these tap samples and the sample from the Marsh spring ca siderable prevalence of these bacteria. In two of the t isolated from as small test volumes as one-tenth c. c.

These analyses are consistent with what would be spection of the surroundings and conditions at the vari The driven wells are in a populated district and the doubtedly subject to considerable pollution from sewage

From the analyses at hand it is impossible to say wh at times reaches the wells in a more or less direct way tion effected by its slow passage through the subsoil. sample collected at the time of inspection indicates that was being affected by the wastes from the surrounding p these had been oxidized and purified through the agency o in the passage of the water through the soil. However, s cies cannot be relied on and the present driven wells ar location. The Niles springs and the flowing wells are r direct source of pollution and appear to be reasonably we accidental pollution. The Marsh springs are not so well surface waters, and as they are located on moderately steep land, are probably subject to considerable intermittent sur

I beg to submit the following conclusions upon the resul examination of the public water supply of Ellicottville:

1. That while it is improbable that all the cases of which have occurred are traceable to the public water likely, by reason of the proximity of habitations and c wells at the pumping station, together with the opportuni infection at the Marsh springs and from the creek su water had been a contributory cause of the prevalence of

2. That the driven wells supply in the village, while in condition at the time of inspection, is dangerously locate ence to the population, on the immediate watershed and t and elevation of cesspools.

3. That with the exception of an opportunity for surface manured fields entering near the northwestern corner, the r surroundings were in a satisfactory sanitary condition at t inspection.

4. That there exists an opportunity for the pollution of springs by animal polluted surface waters entering the springs basin through the openings in the wooden bulkheads surroun basins.

5. That the presence of sediment in the distributing mains is gradual settlement and accumulation of suspended matters

of the system where there are dead ends or where the velocity of flow is small and should be corrected by a more frequent and more effective flushing of the mains.

In view of these conclusions I beg to recommend:

1. That the cesspool on the premises adjacent to and above the pumping station in the village be abandoned, disinfected and backfilled, and that the drainage from this dwelling be disposed of in such manner as to prevent any possibility of pollution of the ground water supplying the public water supply wells.

2. That because of the undesirable location of the driven wells in the village in a populated region, and, further, because of the likelihood of this area becoming more thickly populated accompanied by a corresponding increase in the danger of pollution of the underground waters of the region, that the Ellicottville Water Co. take action with a view to the abandonment of the present driven wells in the village, and the securing of a safe supplementary supply from wells more favorably situated or from other suitable source.

3. That the basin at the Marsh springs be provided with masonry, concrete or other suitable water-tight walls, in such a manner as to prevent any surface water entering directly into the public water supply.

4. That the reservoir be protected from all surface water from the hillside and manured field above by adequate intercepting trenches to lead any surface wash below the reservoir.

5. That the intake from the creek at the Marsh springs be abandoned and disconnected from the public water supply.

6. That frequent and regular inspections be made by the water company of all the several sources of public water supply of the village in order to prevent any accidental or careless pollution of the public water supply.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the Ellicottville Water Co. and to the local board of health, urging that steps be taken to carry out the recommendations contained in the report.

GOSHEN

ALBANY, N. Y., *February* 28, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation made by the engineering division in the matter of the public water supply of the village of Goshen.

Goshen is an incorporated village in the central part of Orange county. It is on the main line of the Erie railroad sixty miles northwest of New York city and seven miles southeast of the city of Middletown. The present population is about 3,500.

The public water supply for the village was installed in the year 1871 and is derived from an artificial lake formed by a dam across a small tributary of the Wallkill river. The lake or reservoir thus formed is located about 1¼ miles south of the central part of the village. It is a long, narrow, irregular body of water occupying the headwaters of the stream. The area of the watershed tributary to this reservoir is about one-half square mile, and the water surface of the reservoir is approximately 25 acres.

Practically all of the population of the village is supplied from the public water supply. There are about 320 service taps, none of which are metered. The daily consumption of water inclusive of leakage is roughly estimated at

something over 400,000 gallons. The water is sup average pressure of about 48 pounds per square inch.

On November 8, 1901, a report was made to the sioners of Goshen by Mr. James H. Fuertes, consultin city, upon the improvement and extension of the Goshen. At that time this water supply was subjec and odors and high color due to decaying vegetable areas of the reservoir which had been flooded by Fuertes points out that these conditions were due to reservoir by the considerable draught made upon it b exposing the swampy flats. The latter when exposed to rise to the vegetable growths imparting to the water agreeable characteristics. With respect to these parti Fuertes concludes that they can be largely remedied a an increased yield be derived by building a dam across shallow portion of the reservoir. His other conclus reference to the question of future supply and the desi the waste of the public water supply. These last consid are of great importance in view of the fact that the pres tion approaches the limit of the yield which can be present reservoir and its watershed, are not directly c sanitary conditions of the supply and will not be consider

In compliance with a request, received from the board of ers of Goshen, for advice in regard to increasing the suppl time improving certain insanitary conditions affecting t water in the reservoir, an investigation was made of the pr of the village of Goshen on February 5, 1912. This invest by Mr. A. O. True, assistant engineer of this Departmen engineer was accompanied by the local health officer and se the board of health and board of water commissioners.

Good sanitary conditions prevail upon the watershed of th the exception of a house and group of farm buildings to be r and possibly some slight road wash at the southern end o There are but three houses on the watershed. One of these end of the reservoir is about one-eighth of a mile distant f A second is east of the central part of the reservoir and on fl 500 feet distant. The third house is that known as the Bank located near the extreme southern end of the watershed and from the reservoir.

It is on the western side of the highway and near the foot o steep slope forming the southern limit of the watershed. Jus house there is a gully forming the natural drainage line of th the adjacent hillside. This drainage line passes between the h at which point it is covered for a distance of perhaps 125 fe again at a retaining wall along the southern margin of the gro the house and barn. Below this wall is a ditch which receive from this gully and drains the barnyard and surrounding terr flow from this ditch enters the gutter along the western side c and follows it to the reservoir.

Upon the retaining wall at the point of emergence of the drai the gully water is a privy with a nonwatertight vault. At the t inspection the barnyard contained a large accumulation of m drainage from which must pass directly into the aforesaid ditch tr the reservoir. In addition all surface drainage from numerous ou would enter this ditch and also be carried to the reservoir.

A few feet below the house along the road is a low point on t which separates the watershed of the reservoir from that of a sma of Otter Kill, thus offering an opportunity of diverting the flow Banker property into the watershed of Otter Kill. Water thus would have to flow a distance of something less than a quarter of before reaching the stream.

Nearly three-eighths of a mile southwest of the Banker house and just over a low point in the divide between the reservoir shed and that of a branch of Quaker creek there is a swampy depression adjacent to the Burrell farm which is owned by the village. The possibility of making this area tributary to the reservoir is discussed in Mr. Fuertes' report of November 8, 1901. In this report it is pointed out that at a small expense the water tributary to this basin could be directed into the reservoir and its yield thus increased by some 70,000 gallons per day, provided the storage facilities in the reservoir were increased by building the second dam. In the event that the storage in the reservoir was not increased Mr. Fuertes estimates that the Burrell farm basin will only be available for an increased yield of 30,000 gallons per day — an increase, in his opinion, hardly worth while unless the second dam is built and the storage thus increased.

The village has never carried out these recommendations, made by Mr. Fuertes. A 12-inch tile pipe line has been carried from the basin adjoining the Burrell farm across the divide to a point some 200 feet or more above the Banker farm buildings and in the bottom of the gully before mentioned. I understand, however, that this pipe has not been laid at the proper elevation and grade to divert the water into the watershed of the reservoir, and that it will be necessary, at least in places, to relay it before it can be effectively used.

The area tributary to the basin at the Burrell farm is about 50 to 60 acres. There are two dwellings on this area. One is on high ground directly at the edge of the swamp and has a privy vault a few feet from the high water line. The other house is about 600 feet from the high water line and on fairly level ground on the top of the hill.

In the following table are given the results of analyses of samples of the public water supply of Goshen made by the State Hygienic Laboratory during 1911.

REPORT OF WATER ANALYSES FOR VILLAGE OF GOSHEN

Laboratory number	B-4492 C-2588	B-4954 C-2941	B-5211 C-3175	B-6162 C-3906	B-6534 C-4220
Source	Tap on public supply	Tap on public supply	Tap on public supply	Tap on public supply	Tap on public supply
Collected on	1/10/11	3/29/11	5/16/11	10/24/11	12/28/11
Color	12	5	15	10	15
Turbidity	5	5	10	25	Trace
Odor, cold	1 v.	2 v.	1 v.	1 v.	1 v.
Odor, hot	1 v.	2 v.	1 v.	2 v.	1 v.
Solids, total	68	60	67	57	69
Loss on ignition	41	25	14	24	13
Mineral residue	27	35	53	33	56
Ammonia, free	.028	.012	.026	.026	.030
Ammonia, albuminoid	.302	.154	.146	.248	.180
Nitrites	.002	.002	.003	Trace	.003
Nitrates	0.24	0.20	0.08	0.20	0.06
Oxygen consumed	5.50	2.90	3.60	2.70	2.60
Chlorine	2.00	6.25	1.50	2.50	2.25
Hardness, total	22.1	26	31.2	18.2	28.6
Alkalinity	18.5	23	16	10	13
Bacteria per c.c.	50	550	*23,000	300	400
B. coli type	10 c.c. +	10 c.c. —	10 c.c.	10 c.c. 3+0—	10 c.c. 1+2—
	1 c.c. —	1 c.c. —	1 c.c. +	1 c.c. 1+2—	1 c.c. 0+3—
	1/10 c.c. —	1/10 c.c. —	1/10 c.c. —	1/10 c.c. 0+3—	1/10 c.c. 0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d. disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

* Delayed in reaching laboratory — probably not representative.

From these it is seen that this is a soft water, color has been rather high, and the turbidity summer and fall. The results indicate the water matter throughout the year. This organic mat vegetable origin and undergoes decomposition values are somewhat higher than normal and n sample of March 29, 1911, is abnormally high.

Excluding the result of May 16, 1911, the t not excessive for a water supply of this type. 1 high even for a surface water supply. The type of organisms indicates that while in no s found in excessive numbers, the results would sh prevalent. In two samples, those of May 16, 191 B. coli type were found in as small a volume c evidence of pollution of the water at that tir animal organic matter.

These analyses are consistent with conditions of the watershed. There is probably no large water in the reservoir by dangerous organic wast of nitrogenous organic content of the water is growth of and decay of green plant life compose algae. At certain times, however, more or less u gerous drainage from animal organic matter is rains or melting snow. Such organic material r from manured fields, but at least a portion of it from the buildings and the adjoining inhabited

In summarization I beg to submit the followi

1. That the watershed of the present wa Goshen is for the most part in a reasonabl
2. That the quality of the water is injur from the barnyard, and other animal encl and that the possible drainage from the pri to the safety of the water.
3. That it is questionable if the increase tapping a reservoir to be made by damming a cent to the Burrell farm would pay for the e ing, unless the facilities for storing the materially increasing the reservoir capacit Fuertes' report.

From a consideration of the conditions I w recommendations:

1. That the flow from the ditch draining t from the reservoir by constructing the pr water to the eastward of the highway in suc on the land, but not to flow in any direct lin stream tributary to Otter Kill.
2. That the important questions of imp present water supply, increasing the yield of providing for the development of the fut Goshen be immediately and carefully consid commissioners along the lines recommended t his report of November 8, 1901.
3. That should the basin adjacent to the Bu source of water supply, the privy and any o lution at or near the dwelling already mentic shed be removed to a safe distance from tl reservoir.
4. That regular inspections be made of the watersheds to prevent any accidental, carel reaching the water supply.

5. That if any difficulty is experienced by the board of water commissioners in protecting the public water supply from contamination, they apply to this Department for rules and regulations for the sanitary protection of this supply.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

Copies of this report were transmitted to the board of water commissioners and the local board of health.

GOWANDA

ALBANY, N. Y., *May* 8, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report in the matter of an investigation made at your order of the public water supply of the village of Gowanda.

Gowanda is an incorporated village in the western part of the State, thirty-four miles south of the city of Buffalo. It occupies both banks of Cattaraugus creek and lies partially in the county of Cattaraugus and partially in the county of Erie. It is on the Buffalo and Southwestern Division of the Erie Railroad. The population of the village is about 2,700.

The public water supply is derived practically entirely from the ground water on the hills surrounding the village, and is obtained at several groups of relatively small springs. The water from three of these groups of springs is conducted by gravity to a pond or earth reservoir, which furnishes storage and maintains the requisite pressure in the distributing mains for fire or other purposes. The water from the other springs is collected at one point and conducted directly and by gravity to the distributing system in the village by means of a single line of pipe.

The distributing system consists of about 3½ miles of water mains, ranging from 2 inches to 8 inches in diameter. These pipes are mostly of cast iron, but there are some of wrought iron, and about 1,250 feet of 3-inch wood pipe, which is being replaced by 4-inch cast-iron pipe. The pressure in the village mains is from fifty to seventy-six pounds per square inch.

The water works were built in 1887 and are owned and operated by the Gowanda Water Works Co. of Gowanda, of which Mr. Fred J. Blackman is secretary and treasurer.

Practically all of the inhabitants of the village are served by the public water supply. There are 450 service taps, some ten or twelve of which are metered. The total average daily consumption is 350,000 to 400,000 gallons per day.

The investigation of the public water supply at Gowanda was made by Mr. A. O. True, assistant engineer of this Department, on April 12 to 13, 1912. The engineer was kindly assisted and accompanied by Dr. Herman Johnson, health officer of the village, and Mr. Fred Blackman, secretary and treasurer of the Gowanda Water Works Co.

The reservoir was first visited. This is located near the top of a hill, about three-quarters of a mile northeast of the village. It is of earthen construction — partly in excavation and partly in fill, and has a water surface of about an acre in area. It is said to have an average depth of 10 feet and a capacity of about 3,000,000 gallons, or about ten days' supply.

Just north of the reservoir is a group of springs issuing from a bank below a level field. The water from these springs is led by open channels

to an open basin, from which it is discharged into a 3-inch pipe, provided with a strainer. The pipe is laid through the bed of the reservoir and is introduced into the end of the 8-inch intake pipe to the village. At the top of the bank and about 50 feet from the springs is the manured field of an adjacent farm. Organic matter could be washed in from this field during wet weather.

Just east of the reservoir is another group of springs, the water from which is collected into one channel, and after passing through two wooden grit basins is led by a 3-inch pipe through the reservoir and discharged into the open end of the 8-inch pipe line to the village. These springs and the surface of the watershed tributary to the reservoir, therefore, are subject to some surface wash from adjacent pasture land. An attempt has been made at diverting this water by ditching and raising small dikes at the low places, but this has not been effectively accomplished.

About one-quarter of a mile to the south from the reservoir is an extensive system of springs known as the MacDonald spring. They issue from the sides of a small ravine, having a precipitous slope on the eastern side. The water is collected by a system of many small channels, leading to a screened pipe, which discharged into a large wooden circular tub in the ground, and protected by a small wooden house. This is known as the MacDonald Spring house. From this tub the water flows through a pipe by gravity around a spur of the hill and is discharged into the pipe line from the reservoir to the village at a point a short distance from and below the reservoir.

On the north and west of this spring area there is an opportunity for surface pollution from adjoining fields and pasture lands. Here also diverting trenches have been cut, but they lack effective depth. On flat ground 30 feet back from the crest of the steep side of the ravine east of the "spring house" is a barn and barn yard. A surface drainage course has been cut near the barn which would ordinarily turn the drainage from this source of pollution into another watershed to the south. During heavy rains, however, there would doubtless be some pollution carried into region of the springs. About one-quarter of a mile south of the MacDonald spring is another spring area known as the Bridges springs. They issue from the ground along the side of a hill just south of the highway. The water is collected in open channels and iron pipes and conveyed by gravity to the MacDonald Spring House.

There is a farm house at the top of the hill, but a short distance from a steep slope above the springs. Along the crest of this slope is a garden and a large chicken house. At a short distance back from the road there is a steep knoll adjacent to a lane through which cattle pass. Accumulations of manure were seen on this precipitous slope but a short distance above the springs. During heavy rains there would be ample opportunity for this animal organic matter to be washed into the water from the springs.

On the opposite or south side of Cattaraugus creek from the reservoir and springs described above and about 1½ miles south of the village, there is a group of springs, known as Joll's spring. The water from these springs issues from the ground near the top of a wooded escarpment. The surroundings are uninhabited, and no permanent sources of pollution were noted at the time of inspection. The water is collected by means of small diverting dams and conducted to a small wooden intake vat. From here it flows by gravity directly into a pipe line leading to the village.

The results in parts per million of analyses of samples of water from the public supply collected within two years by the State Hygienic Laboratory and also several collected at the time of this investigation are given in the following table.

REPORT OF WATER ANALYSIS FOR VILLAGE OF GOWANDA

Laboratory number	C-1845	....	B-4771 C-2827	B-6924 C-4540	B-7720 C-5254	B-7719
Source	Tap	Tap	Tap	Tap	MacDonald well	Joll's springs
Collected on	5/24/10*	7/8/10	2/27/11*	1/22/12†	4/13/12*	4/13/12*
Color	8		Trace	Trace	5	
Turbidity	40	....	3	Clear	5	....
Odor, cold	1 v.	....	1 v.	1 v.	1 v.	....
Odor, hot	2 v.	....	1 v.	1 v.	1 v.	....
Solids, total	173	....	192	176	149	....
Loss on ignition	31	....	43	20	8	....
Mineral residue	142	....	149	156	141	....
Ammonia, free	.006	....	.012	.032	.002	....
Ammonia, albuminoid	.028	....	.018	.042	.036	....
Nitrites	.001	....	.002	.001	Trace	....
Nitrates	1.20	....	1.60	1.80	1.00	....
Oxygen consumed	2.40	....	0.80	0.70	1.00	....
Chlorine	3.00	....	3.00	1.75	1.50	....
Hardness, total	129	....	140	134	140	....
Alkalinity	113	....	133	124	127	....
Bacteria per c.c.	10,350	14,000	180	12,750	2,700	1,100
B. coli type	10 c.c. 3+0— 1 c.c. 1+2— 0.1 c.c. 0+3—	10 c.c. + 1 c.c. + 0.1 c.c. —	10 c.c. 1+2— 1 c.c. 1+2— 0.1 c.c. 0+3—	10 c.c. 3+0— 1 c.c. 2+1— 0.1 c.c. 0+3—	10 c.c. 2+1— 1 c.c. 2+1— 0.1 c.c. 0+3—	10 c.c. 1+2— 7 c.c. 0+3— 0.1 c.c. 0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

* Ten days in transit to laboratory.

† Four days in transit to laboratory.

These results show the water to be very hard, and would indicate that the supply was usually free from any considerable color or turbidity. One sample, however, shows a high turbidity and considerable color in the spring and suggests that these characteristics are variable and subject to sudden change. The samples contained but a moderate amount of carbonaceous matter. The results from nitrogenous organic matter varied considerably in the different samples, but were not excessive in any. The albuminoid ammonia content in all samples was moderate. Two of the free ammonia results are low and characteristic of a normal ground water, but the remaining two are much higher and suggestive of an admixture of surface water bearing organic matters.

The total number of bacteria per c. c. was high in all the samples analysed, with the exception of that of February 28, 1911. All the samples, however, were from two to four days in transit to the laboratory, thus giving opportunity for growth and multiplication. The results of the tests for the B. coli type of bacteria are somewhat unsatisfactory. These organisms were isolated from some of the ten c. c. volumes tested and from about half of the one c. c. volumes tested. While the appearance of the B. coli type is usually not of significant importance in occasional large samples as ten c. c. its isolation from smaller samples is usually indicative of more or less pollution from animal sources.

These analyses are consistent with the surroundings of the sources of public water supply of this village. There are many opportunities for pollution from animal matters washed into the springs or reservoir from nearby sources. There is probably little or no permanent pollution at the Joll's springs, and it is noticeable that no B. coli type was found in the one c. c. volumes and in only one out of three of the ten c. c. volumes of water from this spring.

From a consideration of the results of this investigatic the following conclusions:

1. That the majority of the springs constituting th water supply of the village of Gowanda are subject tc lution during heavy rains and wet weather from l manurial fertilizers, pasture lands, animal enclosures a some human organic matter from the dwelling house i the Bridges springs.

2. That the discharge of spring water collected in c rectly into the village mains with no adequate oppo mentation in the reservoir or suitable settling basin ca turbidity in the supply during heavy rains.

3. That while the pollution from the above sources h been excessive, it is of an undesirable character, and sickness in the dwellings near some of the springs would the health of the village.

In view of these conditions I would recommend:

1. That all dangerous and undesirable pollution be rei public water supply by

a. Removing all sources of pollution to a safe dist immediate surroundings of all the springs.

b. Construction of deep and properly graded ditc trenches to effectually prevent polluted storm water froi the public water supply.

2. That the turbidity in the water caused by the ero heavy rains be corrected by (a) paving the springs and cc nels, and protecting them from surface flow, or (b) pass public water supply through adequately large and suit basins.

3. That owing to the difficulty of protecting the many sou supply from organic and possibly dangerous pollution and of installing works for preventing the fouling of the w pended matters at certain seasons, the water company inve possible sources of water supply for the village with a view the present sources of supply by some other adequate anc source whose sanitary quality can be readily controlled.

4. That regular and frequent inspection be made by tl Water Works Co. of all sources of public water supply for in order to prevent any direct and permanent pollution and t the opportunities for accidental or careless pollution of this

Respectfully submitted,

THEODORE HORTO

Chief

Copies of this report were inclosed in letters addressed to the Water Works Co. and to the local board of health, urging tha taken to carry out the recommendations made in the report.

GRANVILLE

ALBANY, N. Y., *July* 2

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany*, N

DEAR SIR: — I beg to submit the following report upon a recent i tion of the public water supply of the village of Granville.

Granville is an incorporated village located in the northeastern Washington county, adjacent to the New York-Vermont state bound It is on the Delaware & Hudson railroad about seventy miles nort the city of Albany. The village occupies both banks of the Mettaw The present population is about 4,000.

The public water supply of the village is derived from the Mettawee river at a point within the corporation boundaries, about one-quarter of a mile above the power dam. The intake chamber is on the right bank of the river at a point where the margin is steep. The bed of the river is of a hard rocky character at this point and the water relatively deep. The chamber is of dry rubble masonry about six feet square. The water enters the chamber through a large vertical opening with a quarter inch mesh screen bearing against iron bars.

It is said that in winter trouble has been experienced from ice at the intake and that it has been necessary at times to take the water directly from the flume at the dam. The water at this point is polluted by drainage from privies on the shores but a few feet above the station, by sewage from the schoolhouse not more than 1,000 feet above the dam, and by several drains discharging into the river.

The water passes to the pumping station located on the right bank of the river just below the D. & H. railroad bridge over the Mettawee river. The combined electric light and pumping station is operated by water power from the river with steam auxiliary. There are two triplex pumps, having a capacity of 500 gallons and 1,000 gallons per minute respectively. These are hydraulically driven except during low water, at which times they are motor driven.

The water is pumped directly into the distributing mains of the village and pressure and storage is provided for by means of a reservoir located on the hill within the corporation, northeast of the center of the village. This reservoir is in excavation, part of which is rock, and is built with rubble masonry walls. It is uncovered and approximately 90 feet long and 50 feet wide and averaging 14 feet deep. The capacity of this reservoir is estimated at 500,000 gallons. The top of the reservoir is about 175 feet higher than the average elevation at the center of the village. It is understood that a contract has recently been let by the village for the construction of a new reservoir of reinforced concrete construction, about 100 feet in diameter and 20 feet deep, holding when full something over 1,000,000 gallons. This reservoir is to rest on a foundation the walls to be built above the ground. It will be located near the present reservoir but on somewhat higher ground.

The distributing system is of cast iron pipe with a relatively small amount of wrought iron pipe mains. There are about ten miles of mains ranging from 2 inches to 10 inches in diameter. The average water pressure in the village is about 70 pounds per square inch.

The water works are said to have been installed some time prior to 1885 by a private company. These works were taken possession of and enlarged by the village at that date. The works are at present owned by the village and are under the direction of a committee of the board of trustees of the village. Mr. Mostyn Parry is the active member of the committee.

Practically all of the inhabitants of the village are served by the public water supply. There are about 700 service taps, a few of which are metered. The average daily consumption is estimated at 300,000 gallons.

At the request of the local health officer, Dr. William L. Munson, an inspection was made on June 20 and 21, 1912, of the water works of Granville and those portions of the watershed of the Mettawee river above the intake where there are the most opportunities for direct pollution of the public water supply. This inspection was made by Mr. A. O. True, assistant engineer of this Department, accompanied by Dr. William L. Munson, health officer of Granville.

The Mettawee river, from which the water supply of the village of Granville is pumped, rises in the mountains of Dorset, Vt., about sixteen miles southeast of Granville. The watershed of the stream above the D. & H. railroad bridge in Granville is estimated from the topographic maps of the U. S. Geological Survey to have an area of 117 square miles. No gaugings are at hand of the discharge of the Mettawee river at Granville. Gaugings of this river made in September, 1908, by the State Engineer and Surveyor at the second bridge above the confluence of the Mettawee river and Wood creek and about fifteen miles as the river flows below Granville would indi-

cate that the probable average minimum flov about 0.058 cubic feet per second per squar Assuming that the run-off per square mile v average minimum discharge of the Mettawe about seven cubic feet per second.

The principal centers of population on the the hamlets of Dorset, East Rupert, Pawlet, Vermont. They are small communities rangii in each. In addition there is a considerable ı located along the stream and its main bran sewers or sewer systems discharging into t above the Granville water works intake.

There are no dangerous sources of polluti above the water works intake. For a distanc point the river winds through low flat grou during freshet times. There are no habitatio along this reach, and it is not likely, because that it will ever be used for buildings. Ab stream enters the river from the north. On as Mill brook is the outlet of St. Catherin other branch known as Wells brook rises in northern part of the watershed.

St. Catherine lake is about four miles lo mile wide. It is flanked on the east by St. to an elevation of 1,227 feet above sea level, what lower hills of South Poultney. The l summer and there are cottages along the sh on the northwest and southwest shores. Ther the shores of the lake.

The southwestern shore of the lake was ins mile and a half. The greater part of the co end of the lake are along this part of the sho 30 to 40 cottages. The majority are loca water's edge, but the premises appeared in all tion. In practically every case the privies v back from the water's edge.

On the southeastern side of the lake for a the head of the lake the mountain rises abru at infrequent intervals there are no suitable l part of the shore. There is one permanent of cottages along this part of the lake.

There is said to be considerable bathing and season.

There is but a small population on the upp hamlet of Wells is located on the northern si mile above its junction with Mill brook and fluence with the Mettawee river. The hamle not over 250 people. Most of the houses are and there is little opportunity for direct pol private sewers in the community.

There is no considerable opportunity of p along the valley between the mouth of Wells l a distance of about 6½ miles. The tributar directly from the mountains. About two mi highway follows the right bank of the riv Along this stretch there are some barns, anin near the water's edge. They are probably the tion of the river.

The village of Pawlet is at the confluence of the Mettawee river and Flower brook. It is about 7½ miles above Granville as the river flows. The population is about 300. Through the courtesy of Dr. H. S. Manchester, health officer of the town of Pawlet, Vt., an inspection was made of the village with reference to the sources of pollution of the Mettawee river. The village has no public water supply or sewer system. There is a covered stone drain in the southwestern part of the village which discharges surface and storm water into Flower brook. There is one water closet and one privy vault draining into the stone drain.

The buildings along the main street extend to the southern edge of a gorge through which flows Flower brook. There are two privies over the stream on this street. One of these is a dwelling house and the other is a large privy and urinal in the hotel.

Flower brook rises in the adjoining town of Danby. There is a considerable population along the various branches of this stream, but there are no villages or hamlets. In the upper part of the watershed the highway follows the main stream closely for several miles. This stream was not inspected for any great distance above Pawlet, but from the topographic maps it appears that many of the houses are very near the stream and branches.

No inspection was made of the Mettawee river above Pawlet. Dr. Manchester stated that he knew of no considerable direct sources of pollution along the river or in the few small communities on the river above Pawlet.

The results of the analyses of samples of the public water supply of the village of Granville made at the State Hygienic Laboratory in the past three years are given in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; m. musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as—: Free ammonia	Nitrogen as—: Albuminoid ammonia	Nitrogen as—: Nitrites	Nitrogen as—: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+=present, —=absent): 10 c.c.	1 c.c.	1-10 c.c.
......	Granville......	Washington...	Tap, public supply.....	3/25/09	5	20	....	....	71	....	52	.032	.300	.001	0.20	3.40	1.50	54.3	39.5	1,000	+	+	+
B-4365	Granville	Washington...	Tap, public supply.....	12/15/10	5	5	1 v.	1 v.	95	11	84	.026	.014	.002	0.50	1.50	2.00	84.3	83	375	3+0—	1+2—	0+3—
				2/28/11	15	22	1 v.	1 v.	76	25	51	.078	.040	.007	0.40	0.80	1.75	45.7	44	5,900	3+0—	2+1—	1+2—
											[illegible]	[illegible]	[illegible]	.001	0.08	1.40	1.25	90	87	4,400	3+0—	3+0—	0+3—

The Mettawee river furnishes a water carrying a more than moderate amount of hardness. The samples would indicate that the amount of color of the water is low to moderate. The turbidity appears to be variable, with low turbidity content during a considerable part of the year, and a high content during the spring. The nitrogenous organic matter, the amount of which in a water supply is taken in conjunction with other characteristics as an indicator of the probable amount and character of pollution, is variable in amount in this series of analyses. With one or two exceptions that part of the nitrogenous organic matter appearing as free ammonia is high. The figures for albuminoid ammonia with the exception of the sample of March 25, 1909, are moderate. The nitrites are normal except the sample of February 28, 1911. This sample shows a somewhat high value for nitrites. The samples contained a moderately high amount of nitrates.

The values for "oxygen consumed" which are indicative of relative amounts of carbonaceous organic matters are moderate in the results given herewith.

The figures for chlorine are considerably above normal for the locality. The normal chlorine for this region is about 0.45 parts per million. The average excess chlorine is therefore more than one part per million. This may be and probably is largely indicative of past pollution and not necessarily indicative of present and active pollution.

The results of the bacteriological analyses are also variable. The total bacteria vary from moderate, for a surface water, to figures which are excessive for water used for potable purposes. With the exception of the sample of October 2, 1911, the excessively high counts appear in the samples collected in the months of February and March. The results of the tests for the B. coli type of fecal organisms indicate a dangerous frequency in the occurrence of high numbers of these bacteria. Eight out of 21 one c.c. volumes of the water tested gave positive results for the B. coli type. Two of the samples showed the presence of this type of organism in as small volumes of the water as 0.1 c.c.

These chemical and bacteriological analyses of this water supply are consistent with the conditions upon the watershed of the river from which it is derived. The population on the watershed above Granville though small is distributed along the river and tributary streams, which are in many places closely followed by the highways. There is considerable dairy farming and some pollution of the water by animal wastes. These wastes, where they reach the watercourses more or less directly, injure the aesthetic quality of the water and where mixed with human excrements are dangerous to those using it for potable purposes.

There are several opportunities for direct pollution of the main streams by human excreta. This is the most dangerous type of pollution because it enters the water supply almost continuously and practically at all seasons and thus becomes a medium whereby infection may be directly introduced into the supply.

In view of the conditions upon the watershed of this public water supply, as briefly outlined in this report, I beg to submit the following conclusions:

1. That the Mettawee river furnishes an adequate, and with reference to its physical and aesthetic qualities, a satisfactory source of public water supply for the present and future needs of the village.

2. That the water supply is somewhat hard and at times subject to considerable color and turbidity.

3. That the sanitary quality of the water is injured by animal organic matter which reaches the river more or less directly and without natural purification by passage through the soil. Such pollution may be dangerous to health, injures the aesthetic quality of the water and fosters the growth of objectionable algae in the reservoirs.

4. That a continuance of the direct pollution of the river and tributary streams by human fecal matter invites an infection of the public water supply of the village of Granville accompanied by the probability of an epidemic of water carried disease.

5. That the water of the Mettawee river in the powerhouse flume is subject to dangerous pollution by the privy vaults on the bank directly above and by the sewage from the schoolhouse and drainage from houses along the right bank.

I therefore make the following recommendations:

1. That the water commissioners of the village of Granville endeavor to correct all insanitary conditions on the watershed of the Mettawee river above the village, and that for this purpose they make a complete canvass of all parts of the watershed and co-operate with the local health authorities and the owners of the property concerned.

2. That should it prove to be impracticable or not in accordance with economy to remove the dangerous sources of pollution from the river and its tributaries, that the village of Granville install works for the purpose of subjecting the public water supply to some approved process of filtration.

3. That in view of the fact that the greater part of the watershed from which this supply is derived is located in the State of Vermont, and that it will be necessary and desirable to invite the co-operation of the public health authorities of this State, that a copy of this report be transmitted to the Vermont State Board of Health.

4. That until such permanent improvements as recommended above can be effected, the water pumped to the village be treated with hypochlorite of lime. A plant for the application of hypochlorites would be small and inexpensive, but would have to be installed and operated under the supervision of an expert.

5. That the dangerous and insanitary conditions now existing in the village of Granville along the right bank of the river above the dam be abated. Also that the intake works be improved to prevent the necessity of taking water at any time from any point below the present intake.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

Copies of this report were transmitted to the board of water commissioners, to the local board of health and to the State Board of Health of Vermont.

GREENWICH

ALBANY, N. Y., *July* 11, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon a recent investigation of the public water supply of the village of Greenwich.

Greenwich is an incorporated village located in the southwestern part of Washington county. It occupies both banks of the Batten Kill at a point about thirty miles north of the city of Troy. The present population is about 2,600.

The public water supply is derived from Fly creek at a point about 3½ miles south of the village. The water is impounded in a small storage reservoir from which it flows by gravity to the distributing system in the village. There is a supplementary reservoir located about a mile and a half north of the village, and fed by a small watershed, which is used as a reserve for fire protection. Except at times of fire emergency this reservoir is shut off from the system.

The distributing system in the village consists of about 3.8 miles of cast-iron pipe mains from 4 inches to 8 inches in diameter. The average pressure in the village mains is about fifty pounds per square inch.

The water works were built about twenty-five years ago by the Greenwich Water Company of Greenwich, by whom they are at present owned and operated. Dr. Henry Gray is president of this company.

The works serve about 90 per cent. of the inhabitants of the village. The total average daily consumption is estimated at from 250,000 to 300,000 gallons. There are about 300 service taps, eight of which are metered.

The investigation of the public water supply at Greenwich was made on June 22, 1912, by Assistant Engineer A. O. True. The assistant engineer consulted with Dr. P. H. Hulst, the recently appointed health officer; with Dr. J. A. Rich, previous health officer, and with Dr. Henry Gray, president of the Greenwich Water Company. On the inspection the assistant engineer was accompanied by Dr. J. A. Rich, formerly village health officer, who, being familiar with the location and details of the works, kindly offered to assist in the inspection.

The impounding reservoir is formed by a rubble masonry dam across the stream, west of the Greenwich and Johnsonville Railroad, between Easton Station and Archdale. The reservoir is about 250 feet in length, 175 feet wide and averages about 5 feet deep. It has a capacity of approximately 1,500,000 gallons, or about five days' supply. The dam is of rubble masonry and is about 60 feet long and 6 feet high. There is a spillway on the southern end of the dam about 6 feet in length. At the other extremity of the dam there is a gate house with masonry chamber and wooden superstructure.

On the northeast side of the railroad embankment borders the reservoir for a distance of some 150 feet. Along this margin there is a shallow ditch at the foot of the railroad embankment, but otherwise nothing to protect the water in the reservoir from pollution from the railroad. The upper or southeastern end of the reservoir borders on low meadow land, and although cattle cannot approach the water because of the fence around the land adjacent to the reservoir, cows do have access to the stream and low ground just above the reservoir. There appeared to be no other opportunities for direct pollution in the vicinity of the reservoir, and there are no habitations or other buildings near by. The nearest house is some three-eighths of a mile distant.

Fly creek rises near Willard mountain in the town of Easton and flows easterly for nearly two miles to Fly Summit, then turns northerly and flows about six miles, emptying into the Batten Kill at Greenwich. Fly Summit is about 2½ miles above the water works reservoir. The main tributary of Fly creek is a stream entering from the southeast at a point just above the reservoir. This stream rises near North Cambridge, through which settlement it flows. The total area of the watershed of Fly creek above the reservoir is about 7.5 square miles. The Greenwich and Johnsonville railroad follows the valley of Fly creek from Fly Summit to Greenwich and crosses the stream several times above the reservoir. It also lies close to the stream for considerable distances at several points and particularly just above the reservoir. One railroad crossing is but a few hundred feet above the entrance of the stream into the reservoir.

Near the railroad crossing at Archdale, which is about three-fourths of a mile above the reservoir, there is an animal shed and some chicken yards near the margin of the stream. Just south of Archdale the stream flows through extensive swamp lands. The greater part of the watershed is farm land, and there is considerable cultivated and dressed land and pasture along the stream.

During the extreme low water of the last year or two it has been necessary to supplement the supply used for potable purposes by pumping from Batten Kill in the village.

The Greenwich Water Works Company were contemplating the installation of new works in connection with a new source of supply from another stream southeast of the village. This contemplated work has not been carried out owing to the failure of the company to obtain from the village a franchise for the number of years desired.

The results of the analysis of samples of this public water supply collected by the State Hygienic Laboratory in the last four years are given in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Sour	Date of collection	Physical		Odor		Chemical (Parts per Million) Solids			Nitrogen as—						Hardness		Bacteriological	B. Coli Type +=present —=absent		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
....	Greenwich.....	Washington..	Tap, public supply.....	5/ 4/08	19	5	....	....	113	....	....	.018	.118	Tr.	0.20	3.90	1.00	70	....	250	+	+	......
....	Greenwich.....	Washington..	Tap, public supply.....	2/ 3/10	47	Trace	....	....	135	....	99	.016	.060	.002	0.30	5.90	1.50	68.6	....	550	+	—	—
....	Greenwich.....	Washington..	Tap, public supply.....	9/13/10	20	13	....	....	124	....	118	.010	.110	.001	0.04	2.20	1.25	114	112	200	+	+	—
....	Greenwich.....	Washington..	Tap, public supply.....	12/ 1/10	15	Clear	....	....	164	....	114	.012	.050	.001	0.16	2.80	2.00	114	112	300	......	......	......
B-4651 C-2718	Greenwich.....	Washington..	Tap, public supply.....	2/ 6/11	15	5	1 v.	2 v.	133	47	86	.008	.080	.001	0.60	3.80	1.75	85.7	85	850	2+1—	0+3—	0+3—
B-4756	Greenwich.....	Washington..	Tap, public supply.....	2/28/11	......	......	....	....	....	....	....	....	....	....	....	....	....	....	....	8,900	3+0—	2+1—	0+3—
B-5084 C-3063	Greenwich.....	Washington..	Tap, public supply.....	4/26/11	15	5	1 v.	2 v.	128	31	97	.010	.108	.003	0.24	4.50	0.75	85.7	76	110	1+2—	0+3—	0+3—
B-5514 C-3414	Greenwich.....	Washington..	Tap, public supply*....	7/ 5/11	10	......	1 v.	1 v.	210	20	190	.020	.042	.002	0.20	2.90	0.75	189	187	600	3+0—	2+1—	1+2—
B-5759	Greenwich.....	Washington..	Tap, public supply*....	8/30/11	......	......	....	....	....	....	....	....	....	....	....	....	....	....	....	500	3+0—	2+1—	1+2—
B-5964 C-3757	Greenwich.....	Washington..	Tap, public supply*....	10/ 3/11	15	Trace	1 v.	1 v.	189	54	135	.012	.114	.001	0.12	3.90	2.00	134	90	400	3+0—	3+0—	1+2—
B-6281 C-4011	Greenwich.....	Washington..	Tap, public supply.....	11/ 8/11	30	Trace	1 v.	1 v.	142	28	114	.016	.160	.001	0.20	8.80	2.00	71.4	60	[illegible]	[illegible]	[illegible]	[illegible]
B-6619 C-4300	Greenwich.....	Washington..	Tap, public supply.....	12/14/11	22	1	1 v.	1 v.	148	20	128	.008	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B-6958 C-4598	Greenwich.....	Washington..	Tap, public supply.....	1/29/12	22	Cl[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B-7359 C-4951	Greenwich.....	Washington...	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

From these figures it is seen that this supply is high in hardness and color and usually relatively free from turbidity. There is a considerable content of nitrogenous organic matter in the majority of samples. This appears mostly, however, as albuminoid ammonia. The figures for free ammonia are for the most part but moderate, and the nitrite values are normal. The water contained considerable nitrates or mineral nitrogen. The chlorine contents is above normal. The average for these samples is about 1.4 parts per million. The normal chlorine for this part of the State is less than 0.5 parts per million.

The bacteriological results are somewhat unsatisfactory. The total counts, while not excessively high, in nearly all the samples are high for a potable surface impounded water. The two highest counts are excessive. The samples of April 26, 1911, and April 18, 1912, appear to have shown a reasonably satisfactory analysis both chemically and bacteriologically. The results for the tests for the B. coli type of fecal organisms are unsatisfactory.

These organisms were found in large numbers in many of the samples. They appear in about one-third of the one cubic centimeter samples. The occurrence of relatively moderate numbers of the B. coli type of organisms in a water supply probably is not indicative of serious pollution, but their frequent occurrence in volumes as small as one c. c. is considered strong evidence of pollution by animal organic matter. The samples of July 5, August 30 and October 3, 1911, show moderately high total counts of bacteria and excessively large numbers of the B. coli type of organism. I understand from the water company that water was being pumped from the Batten Kill at the time these samples were collected. While no analyses of the Batten Kill are at hand it seems probable, judging from its large and well populated watershed, that this stream carries considerable pollution, especially at points in the lower part of the village. Such pollution coming from the water of the Batten Kill would probably account for the occurrence of high numbers of the fecal type of organisms occurring in the public supply during the dry season of 1911.

The results of these analyses are consistent with the conditions on the collecting area and at the reservoir of the watershed. Several opportunities exist for the pollution of the water from Fly creek by animal organic matters. The greatest part of this pollution is probably caused by the proximity of cattle to the reservoir and the streams tributary thereto. At one point at least there is an opportunity for the direct entrance into the running water of the supply of surface wash from animal enclosures. There is also undoubtedly some pollution caused by the railroad which, as has been mentioned, passes through the watershed and is in proximity to the main streams for considerable distances. Any pollution from toilet rooms on the trains or from carelessness of employes of the railroad which entered the water supply directly at the stream crossings or by being washed from the tract during heavy rain would be a menace to the health of the village.

In view of the conditions outlined above I would submit the following conclusions:

1. That the water supply derived from the present works on Fly creek is of moderately good physical quality, but subject to some animal and human pollution and is inadequate to supply the increasing needs of the village.

2. That while the pollution from cattle, animal enclosures or other areas occupied by animals or dwellings can be eliminated or at least reduced to a minimum at comparatively small expense by the enforcement of rules and regulations enacted by this Department in accordance with the Public Health Law, it would probably be impracticable to prevent the occasional and dangerous pollution of the water which might occur from the travel on the railroad.

I therefore beg to submit the following recommendations:

1. That should Fly creek be retained as a main or supplementary supply the Greenwich Water Company take steps to remove the present

opportunities for pollution by cattle or direct premises, applying, if necessary, to this Departme rules and regulations for the sanitary protectior supply.

2. That owing to the difficulty and expense in dangerous polluting from the railroad entering reservoirs, this supply be subjected to some approv

3. That, owing to the inadequacy of the Fly for the probable present and future needs of the vi pany immediately take up with the village officials ing a new or supplementary public water supply f shall be of satisfactory, sanitary and physical quali some years to come.

4. That in view of the questionable sanitary qual Batten Kill that all water taken by the water compa for potable purposes be treated by hypochlorite bef into the village mains until such time as this suppl a new supply or subjected to an approved process of

5. That the Greenwich Water Company cause fre inspections to be made of all parts of all watershe water supply purposes in order to prevent any accid dangerous pollution of this supply.

Respectfully submitted

THEODORE I

Copies of this report were inclosed in letters addressed Water Company and to the local board of health *urging th* to carry out the recommendations made in the report.

HIGHLAND

For report see "Investigation of Outbreaks of Typhoid Fev this report.

HILBURN

ALBANY, N. Y., *Ap*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Alban*

DEAR SIR: — I beg to submit the following report in the ma vestigation made at your order of the public water supply of Hilburn.

Hilburn is an incorporated village located in the western part county, half a mile from the New York-New Jersey State line. main line of the Erie railroad 33 miles from New York city. Th of the village is on the right bank of the Ramapo river. The p lation is about 1,000.

The public water supply for the village is secured from two sources, one being a surface impounded water from a watershed o tain ¾ of a mile west of the village, and the other a driven premises of the Ramapo Iron Works in the northeastern part of

The upland water is stored in a reservoir formed by a masonry across a mountain stream at an elevation of about 200 feet above This dam is of rubble masonry with concrete facing and coping. part of the dam is about 250 to 300 feet long and it is adjoined by wall along the embankment on the northern side of the reservoi

highest point of the dam the coping is about 20 feet above the bed of the stream. At this point there is a spillway about 30 feet in width. The area of water surface of this reservoir is estimated at 4 acres, and the average depth at 7 or 8 feet. This gives a storage capacity of about 10,000,000 gallons. The watershed tributary to this reservoir is very nearly bisected by the New York and New Jersey boundary line. It has an area of about ¾ of a square mile.

The ground water supply, which is said to be used only during dry weather or in case of fire or other emergency, is taken from a driven well, already mentioned as being on the premises of the Ramapo Iron Works. This well is located south of and about 40 to 50 feet distant from the buildings of the Rockland Electric Company's plant. This site is in the low ground in the northeastern part of the village between the Erie railroad tracks and the Ramapo river. The well is about 300 feet east of the river and some 80 feet west of the railroad tracks. It is said to have a 12-inch casing and is about 30 feet in depth. It is said to be driven through a top material of sand, then through hard pan into coarse gravel below the hard pan.

The pumps ordinarily used for raising this well water are in the plant of the Ramapo Iron Works and on the opposite side of the railroad and some 200 feet east of the well. Here are located 3 duplex steam pumps which pump the water directly into the village mains. These pumps can also take their suction from another driven well belonging to the Rockland Electric Co., and from an intake in the Ramapo river.

In the nearby plant of the Rockland Electric Company there are two electrically driven triplex pumps used for pumping the cooling water for the gas engines. These pumps ordinarily take their suction from the Rockland Electric Company well, but they are interconnected with the Ramapo Iron Works pumps, both the driven wells, the village distributing system and an inlet from the river known as the "Slough." Thus it is possible for any of the pumps to be used for pumping from either well or the river and discharging into the village mains. It is said by the officials of the Mountain Spring Water Company which controls and operates the waterworks that water is not pumped into the village mains from the river, nor is it ever expected that this will be done except in case of some emergency.

About 80 per cent. of the population of the village are said to be served with the public water supply. There are about 126 service taps only a few of which are metered. There are no approximately correct figures available as to average daily consumption of water by the village. The average pressure in the mains is about 90 lbs. per square inch. The waterworks are owned and operated by the Mountain Spring Water Co.

The investigation of these waterworks was made by one of the assistant engineers of this Department, Mr. A. O. True, on April 3, 1912. The engineer was accompanied and assisted by Dr. M. J. Sanford, village health officer, and Mr. D. F. Conklin and Mr. L. E. Gage, members of the board of health. Information concerning the works was also kindly given by Mr. William Miller, superintendent of the Rockland Electric Company. An inspection was made of the watershed above the dam, the wells, pumps and river intakes and samples of water were taken from several points in the system and sent to the State Hygienic Laboratory for analysis.

The watershed of the reservoir west of the village extends to the top of the mountains of the Ramapo range just south of the gap through which the Ramapo river flows in a southeasterly direction. The topography is characteristic of these well known hills. The peaks and precipitous slopes are of granite origin largely bare or covered with but a thin layer of soil. The region is thinly wooded and there is little or no swamp area. Such a watershed is favorable for the collection and storage for household and public purposes of a soft water, which, with ordinary care, would be free from direct organic pollution.

While there are no habitations on the watershed directly tributary to the reservoir there is an opportunity for contamination of the public water supply through the water from a small stream which has been piped into the

reservoir from a point some distance to the east. T
number of springs at a point about ⅝ of a mile soutl
probably in the State of New Jersey. Coincident with
waters of this small tributary is a settlement of four
occupied by 21 people. The privy vaults for some of th
near natural drainage lines toward the springs. Ther
for pollution of the water from the drainage from st
closures. One small outbuilding is directly on the edge

No direct sources of pollution were found at the dri
lage. The wells, however, are in low ground in a region
by a considerable number of people, and the opportunity
tion are dependent principally upon the physical condi
surrounding the wells.

The results of the analyses of samples collected at the
and previously by the State Hygienic Laboratory are giv

REPORT OF WATER ANALYSES FOR VILLAGE OF I

Laboratory number	B-6544 C-4231	B-8907 C-4558	B-7615 C-5177	B-7618	
Source	Tap on public supply	Tap	Ramapo Iron Works well	Ramapo River	
Collected on	12/7/11	1/23/12	4/3/12	4/3/12	
Color	15	20	15	....	
Turbidity	Clear	Clear	25	....	
Odor, cold	1 v.	1 v.	1 a.	....	
Odor, hot	1 v.	1 v.	1 a.	....	
Solids, total	50	43	165	....	
Loss on ignition	22	11	32	....	
Mineral residue	28	32	133	....	
Ammonia, free	.016	.034	.038	....	
Ammonia, albuminoid	.044	.064	.104	....	
Nitrites	Trace	Trace	.036	....	
Nitrates	0.06	0.04	0.72	....	
Oxygen consumed	4.10	4.70	3.70	....	
Chlorine	2.25	2.50	1.50	....	
Hardness, total	26	9.50	77.1	....	
Alkalinity	5.0	3.0	7.0	....	
Bacteria per c.c	70	110	8.200	300	
B. coli type	10 c.c.	10 c.c.	10 c.c.	10 c.c.	
	3+0—	2+1—	3+0—	3+1—	1
	1 c.c.	1 c.c.	1 c.c.	1 c.c.	
	0+2—	1+2—	3+0—	1+2—	1
	0.1 c.c.	0.1 c.c.	0.1 c.c.	0.1 c.c.	0.
	0+3—	0+3—	3+0—	0+3—	0

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, f
4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f,
m, musty; v, vegetable.

REPORT OF WATER ANALYSES FOR VILLAGE OF HILBURN — *Cont'd*

Laboratory number	....	....	....	....	B-4520 C-2597	B-4939 C-2956
Source	Tap	Tap	Tap	Tap	Tap	Tap
Collected on	7/12/09	4/16/09	10/22/10	7/5/10	1/12/11	3/28/11
Color	40	38	5	15	45	35
Turbidity	5	Clear	10	Trace	Clear	Trace
Odor, cold	....	....	....	....	2 v.	1 v.
Odor, hot	....	....	....	....	2 v.	1 v.
Solids, total	67	37	95	51	50	53
Loss on ignition	....	....	....	....	25	36
Mineral residue	38	22	69	30	25	27
Ammonia, free	.056	.016	.004	.078	.032	.004
Ammonia, albuminoid	2.08	.100	.016	1.00	1.04	.124
Nitrites	.002	Trace	.002	.001	.001	.001
Nitrates	0.10	Trace	0.24	0.10	0.10	Trace
Oxygen consumed	7.50	5.80	0.30	4.20	6.00	5.10
Chlorine	1.75	2.25	4.50	3.12	3.00	3.50
Hardness, total	26	20.8	35.1	15.6	14.3	6.30
Alkalinity	24.5	1.0	33.0	11.0	4.0	5.0
Bacteria per c.c	1,300	5,600	200	4,000	1,100	560
B. coli type	10 c.c. + 1 c.c. + 0.1 c.c. —	10 c.c. + 1 c.c. — 0.1 c.c. —	10 c.c. — 1 c.c. — 0.1 c.c. —	10 c.c. — 1 c.c. — 0.1 c.c. —	10 c.c. 2+1— 1 c.c. 1+2— 0.1 c.c. 0+3—	10 c.c. 2+1— 1 c.c. 0+3— 0.1 c.c. 0+3—

Results are expressedi n parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

From these it is seen that the upland supply is a clear, soft water, rather high in color but free from any considerable unstable nitrogenous matter. The samples marked c-2956, c-4559 and c-5178 are evidently made up entirely of upland water because of their softness averaging less than 10 parts per million of hardness. All of the other samples except c-5177 appear to be composed of a mixture of the ground water and reservoir or upland water, the greater part of it, however, being reservoir water.

The total bacteria found in the upland water was in no case excessive, and two of the samples were more than 24 hours in transit to the laboratory. The results for the B. coli type of fecal bacteria are somewhat unsatisfactory and indicate a probable intermittent pollution of the reservoir water with small amounts of animal organic matter. One of the samples shows the presence of these organisms in as small volumes of the water as 1 c. c. This is undoubtedly due to the effect of the habitations at the headwaters of the small stream which is piped into the reservoir.

The analyses of the river water while not showing an excessive number of bacteria for a polluted stream do show the presence of fecal bacteria in almost all the different volumes tested.

The well analysis is unsatisfactory, but in interpreting the results it must be stated that the pumps and pipe connections had not been used for some months and although the pump was run sometime previous to taking the samples, there may have been some residual effect from these conditions. The well water sample was high in color and turbidity, relatively hard and containing a high amount of nitrogenous organic matter, a relatively large part being in the unstable form of nitrites. The chlorine value was probably normal. The total bacteria were high in number and fecal organisms were found in all the volumes of water tested, showing an undoubted pollution by animal organic matter.

The results of the analyses of samples representing the mixture of the reservoir and well water vary greatly in both the chemical and bacteriological character, as would be expected from a mixture of variable proportions of two entirely different waters. The total bacterial counts in these samples

are for the most part high and they show the occas coli type in small volumes. The total organic matte due in part to vegetable stain. The nitrogenous and ever, are too high for a water free from considerab matter of questionable origin.

These analyses are reasonably consistent with the co at the sources of public water supply, though it is not and amount of pollution which is directly affecting Ramapo Iron Works. The intermittent direct pollu water is evidently caused by surface drainage from headwaters of one of the tributary streams already d of pollution of the driven well may be the drainage fr ritory on its watershed which reaches the ground water purification or possibly from rapid seepage from the riv draulic conditions. While it is difficult to judge fron analysis, especially when the sample was taken after a of the well and pump, the extremely high nitrites and hi noid ammonia, together with high numbers of bacteria would suggest possible nearby pollution of the ground w drain from the neighboring plants. I understand that th across this flat ground which serve the various works, a might be possible.

I beg to submit the following conclusions from this inve

1. That the upland water supply would appear to be able one if freed from the dangerous sources of poll been pointed out as existing there, and further if the w the strict supervision of those in charge of the waterw

2. That the existence of habitations and animal enc of the tributaries of the reservoir is a menace to the heal

3. That the water supply derived at times from the lage is subject to considerable and possibly dangerous ever, enough data concerning these wells are not at han clusively as to their character.

In view of the above conclusions I submit the following rec

1. That the direct pollution of the upland water suppl and prevented by the water company by

a. Removal of the buildings to a safe distance from whose waters now enter the reservoir through the 12- or by the exclusion from the reservoir of this water.

b. Regular and frequent inspections of the whole wa tary to the reservoir to prevent unknown and accidenta this part of the public supply.

2. That enough additional safe and suitable upland wate for the village, if possible, at reasonable expense, by the de other mountain streams near the village, to make the use necessary.

3. That meanwhile a thorough study be made by the Wat of the present driven wells in order to ascertain if they are polluted and if any such pollution is due to drains, sewer sources which could be corrected.

4. That the use of the well supplies be discontinued until gation it is shown that they can furnish a safe water at all

Respectfully submitted,

THEODORE HORTO
Chief En

HOMER

ALBANY, N. Y., *June 13, 1912.*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon a recent investigation of the public water supply of the village of Homer.

Homer is an incorporated village located in the west-central part of Cortland couunty. It is on the Binghamton, Syracuse and Oswego division of the Delaware, Lackawanna and Western railroad about midway between the cities of Binghamton and Syracuse and 1½ miles north of the city of Cortland. The greater portion of the village occupies the right bank of the west branch of Tioughnioga river. The present population of Homer is about 2,700.

The public water supply for the village is obtained from four driven wells located in the northwestern part of the village on the right bank of Factory creek, a tributary of the west branch. The wells are 6 inches in diameter and about 50 feet deep. The casings are said to have been sunk through about 16 feet of gravelly material underlying the top soil, then 10 feet of quicksand, then through 12 feet of hard pan, and finally through 12 feet of fine sand growing coarser from top to bottom.

The pumping station is adjacent to the wells. The machinery is housed in a substantial brick building and consists in the main of two steam pumps and two steam boilers. The pumps are Dean duplex compound condensing 10" x 18½" x 10½" x 10", each having a normal capacity of 1,000,000 gallons per day. One boiler is of 80 and the other 60 h. p.

From this station the water is pumped into the distributing mains of the village. Pressure and storage is secured by means of a standpipe located part way up the hill directly east of the village. This standpipe is of steel. It is uncovered and 25 feet in diameter by 40 feet high, having a capacity of nearly 150,000 gallons.

The distributing system consists of about 2 miles of cast-iron water mains from 4 to 8 inches in diameter. The average water pressure in the village is about 98 pounds per square inch.

The waterworks were built in the year 1884. In the original works the water supply is said to have been taken from an existing shallow well located just west of the pumping station. The present tubular wells were sunk about 10 years ago. The works are owned and operated by the village and are under the direction of a board of water commissioners of which Mr. W. E. Burdick is president.

About 70 per cent. of the inhabitants of the village are served by water from the public water supply. There are about 500 service taps, 80 of which are fitted with meters. The average daily consumption of water is about 150,000 gallons or approximately 55 gallons per capita for the total population.

The investigation of this public water supply was made on June 7, 1912, by Mr. A. O. True, assistant engineer of this Department. The engineer was accompanied and assisted in the inspection of the works by Dr. H. S. Braman, health officer of the town of Homer, and a member of the village board of water commissioners.

The four driven wells constituting the source of public water supply are from 15 to 18 feet from Factory creek paralleling the stream and spaced some 6 to 8 feet apart.

When the pumps are not operating the surface of this water in the wells is said to stand about six feet below the ground surface. This distance increases to 10 or 11 feet when water is being pumped at the rate of about 600,000 gallons per 24 hours.

About 150 feet south of and parallel to Factory creek at the pumping station is a street. There is but one house in the immediate vicinity of the pumping station. This house is on the north side of the street and a short distance below the wells. It is provided with a concrete cesspool said to be

watertight. The house and cesspool are about 150 supply wells. On the south side of the street up stre station and some 300 feet to 500 feet distant from the These dwellings are not provided with the public wa privies with earth vaults.

A little over a quarter of a mile west of and above is a large stock farm on both sides of the highway wl of the street just mentioned. There are several large some 170 head of stock and about 28 horses. Anot course of construction.

The results of the analyses of samples of water e Hygienic Laboratory are given in the following table. cover a period of nearly two years.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical				Chemical (Parts Per Million)											Bacteriological			
							Odor		Solids			Nitrogen as—						Hardness			B. Coli Type + = present — = absent		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
....	Homer........	Cortland.....	Tap, public supply.....	5/ 3/10	None	Clear	....	....	145	....	130	.008	.012	.001	0.40	0.35	0.75	117	117	16	—	—	—
....	Homer........	Cortland.....	Tap, public supply.....	5/31/10	None	Clear	....	....	141	....	126	.008	.018	.002	0.60	0.50	1.00	117	117	8	—	—	—
....	Homer........	Cortland.....	Tap, public supply.....	7/19/10	Trace	Trace	....	....	150	....	118	.014	.020	.001	0.40	0.30	1.75	102	100	10	—	—	—
....	Homer........	Cortland.....	Tap, public supply.....	9/ 7/10	Trace	Clear	....	....	168	....	112	.008	.016	.001	0.20	0.10	1.00	109	105	10	—	—	—
....	Homer........	Cortland.....	Tap, public supply.....	11/18/10	5	Clear	....	....	151	....	135	.018	.024	Tr.	0.24	0.10	1.50	134	130	5	—	—	—
....	Homer........	Cortland.....	Tap, public supply.....	12/15/10	Trace	Trace	....	....	153	....	130	.004	.010	Tr.	0.20	0.30	1.75	123	110	8	—	—	—
B- 308 C- 261	Homer........	Cortland.....	Tap, public supply.....	3/28/11	Trace	Trace	2 v.	2 v.	167	40	127	.002	.024	Tr.	0.50	0.90	1.25	126	125	3	—	—	—
B-5372 C-3303	Homer........	Cortland.....	Tap, public supply.....	6/ 9/11	5	Clear	1 v.	1 v.	170	48	122	.014	.024	Tr.	0.30	0.30	1.75	114	113	600	—	—	—
B-5866 C-3665	Homer........	Cortland.....	Tap, public supply.....	9/11/11	Trace	Clear	1 v.	1 v.	157	16	141	.010	.014	.001	0.50	0.60	2.00	129	128	80	—	—	—
B-6327 C-4049	Homer........	Cortland.....	Tap, public supply.....	11/14/11	Trace	Clear	1 v.	1 v.	183	16	167	.016	.030	.002	0.40	0.20	2.50	157	142	60	—	—	—
B-6705 C-4372	Homer........	Cortland.....	Tap, public supply.....	12/27/11	Trace	Clear	1 v.	1 v.	159	17	142	.008	.008	.001	0.60	0.10	2.50	140	140	20	—	—	—
B-7048 C-4666	Homer........	Cortland.....	Tap, public supply.....	2/ 7/12	Trace	Clear	1 v.	1 v.	155	15	140	.020	.026	Tr.	0.90	0.10	1.87	132	136	10	—	—	—
B-7410 C-5001	Homer........	Cortland.....	Tap, public supply.....	3/15/12	Trace	Clear	1 v.	1 v.	166	24	142	.010	.016	Tr.	1.02	0.40	1.50	137	131	10	—	—	—
B-7889 C-5398	Homer........	Cortland.....	Tap, public supply.....	4/26/12	Trace	Clear	1 v.	1 v.	149	18	131	.010	.020	Tr.	0.80	0.10	1.25	131	124	190	—	—	—

From these results it is seen that the water derive is practically free at all times from color or turbidity. vegetable odor either cold or when heated. It carries content in solution and is hard at all times. The tota matters as determined from the values for nitrogen and is considered low. The values for nitrogenous organic in the nitrogen as free and albuminoid ammonia and ni Some of the values for free ammonia are somewhat gre for a ground water supply. The figures for albuminoi a low content of unoxidized nitrogenous organic matter low and in the majority of cases negligible. The amou organic matters as indicated by the "oxygen consumed" i
The chlorine content of all the samples was higher th locality of Homer. The chlorine content of that part which circulate on or below the surface of the earth is aff lation of the watershed on which the water is collected The watershed of the water supplying the ground flow of supply wells of Homer is evidently the catchment area tribu of Factory creek above the present pumping station. Th an approximate area of 16 square miles. It is estimated population per square mile on this area is about 30. Th the domestic animals upon the watershed, some 200 of which at a relatively short distance above the pumping station, p for the excess of chlorine above normal.

In the passage of ground waters through the soil and u the chlorine is not removed while the organic contents of be removed or undergo chemical change. This is probably w in the water derived from these wells. The organic matter the disposition of animal wastes on the watershed of the w enters the ground water and in its slow passage through the deposits of the valley is freed of its impurities by oxidation o ter and removal of bacteria. The chlorine from the animal w unchanged and appears as evidence of their past existence The chlorine is of natural origin and does not affect the sanit the water.

While the relative amount of animal wastes is small and from the point from which the water supply is drawn, and the the subsoil is such as to prevent any rapid flow of waters in a state to the wells through a crevice or underground channel, it that any considerable deterioration in the sanitary quality of th occur. Such supplies, however, require careful supervision of th in the immediate vicinity of the wells to guard against the dange sources of pollution.

The bacteriological analyses are satisfactory and do not in considerable pollution at the time these samples were taken. samples showed a high total count of bacteria and another a count above moderate for a ground water. No fecal bacteria of the B. were found in any of the different volumes of the water examined

These chemical and bacteriological analyses are consistent with ditions on the watershed. While there are a considerable numbe and animals resident on this area they are for the most part at a able distance from the wells, and the processes accompanying natu tion of underground waters appear to be effecting a satisfactory tion of this supply.

I beg to submit the following conclusions upon the results of amination:

1. That the general sanitary conditions upon the watershed public water supply of the village of Homer are satisfactory an are no indications that any direct or dangerous sources of p exist at the present time.

2. That the chemical character of the water is affected by the population and domestic animals resident on the watershed and that these effects are largely due to the large number of animals on the stock farm one-quarter of a mile above the wells.

3. That while the physical, aesthetic and sanitary qualities of this supply appear to have been satisfactory in the past it is important that the board of water commissioners of the village have complete control of the surroundings of the water supply wells for a radius of not less than 500 feet and that this area be put and maintained in an absolutely sanitary condition.

In view of these conclusions I would make the following recommendations:

That the privy vaults of the houses southwest of the pumping station or any other privy vaults within a radius of 500 feet of the wells be removed or else be provided with removable watertight containers and that the board of water commissioners maintain these in a strictly sanitary condition and cause the contents to be taken away to a safe distance and disposed of by burying or other approved means.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were transmitted to the board of water commissioners and to the local board of health.

HOOSICK FALLS

ALBANY, N. Y., *April* 24, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report in the matter of an investigation made at your order of the public water supply of the village of Hoosick Falls.

Hoosick Falls is an incorporated village located in the northeastern part of Rensselaer county. It is on the Fitchburg division of the Boston and Maine railroad, about 24 miles from the city of Troy. The village occupies both banks of the Hoosic river. The present population is about 5,500.

The public water supply for the village is obtained from several shallow wells located at the southern extremity of the village at a point between the east and west bound tracks of the Boston and Maine railroad and some 325 feet east of the Hoosic river. There are four circular wells each about 30 feet in diameter and 20 feet deep. They are sunk in the flats through gravel and quicksand which extend along the right bank of the river. There is said to be about 12 to 18 inches of surface soil overlying the gravel and sand. The lower 9 feet of the well walls are built of wooden curbing composed of 2-inch planks laid with open joints. Above the wooden curbing the wells are walled up in brick 12 inches thick with cement joints. The brick work is said not to have been plastered, and is carried up above the ground surface on an average of about 2 feet. All four wells are protected with wooden conical roofs provided with ventilators.

The pumping station is adjacent to the wells and is housed in a substantial building having a concrete substructure and brick superstructure. There are three pumps. One is a Gould triplex 10 inches by 12 inches, with a capacity of 1,400,000 gallons per day, belted to a horizontal steam engine. The second is a Knowles duplex-tandem-compound-condensing steam pump 12 inches by 24 inches by 18 inches by 12 inches having a capacity of 1,400,000 gallons per day. The third is an old pump for reserve only. It is a Russell vertical compound steam pump having a capacity of about 860,000 gallons per day. The southwest corner of the pumping station building is finished as a residence for the engineer or other attendant of the pumping plant. The plumbing fixtures are said to be connected with a tight cast-iron drain pipe which discharges into the river below the plant.

From the station the water is pumped into the distribu village. Pressure and storage is secured by means of a part way up the hill east of the center of the village. of steel and uncovered, 35 feet high by 40 feet in diameter, about 300,000 gallons.

The distributing system comprises about 8 miles of cast- from 4 inches to 12 inches in diameter. The average pressı is 75 to 85 lbs. per square inch.

The waterworks were built in the year 1886 by a water now owned and operated by the village, having been taken ov pality about 5 years ago. The works are under the directioı on water of which Dr. C. E. Shaw is chairman. Mr. O. S. intendent of the waterworks.

About 90 per cent. of the inhabitants of the village are public water supply. There are 1,730 service taps, 21 of whi with meters. The average daily consumption of water is aboı lons, or approximately 200 gallons per capita per day.

The investigation of this public water supply was made on by Mr. A. O. True, assistant engineer of this Department. In the engineer was accompanied and assisted by Dr. F. J. Cahill officer, Mr. Blackington, member of the village board of health, intendent of the works, Mr. Wright.

As mentioned above, the wells constituting the source of pul ply for the village are located in the flats of the river bottom. wells are within a few feet of each other just south of the pu and are about 80 feet east of the east bound track of the Bost railroad. The fourth well is 200 feet to the north of the th mentioned. This well is within 25 feet of the eastbound railroa wells are all connected by pipes and the pumps take their suc well nearest to the pumping station.

In order to increase the available supply from the wells, an feeder 12 inches in diameter has been laid from one of the gr wells in a southwesterly direction under the railroad track and the flats for a distance of 150 feet. This feeder branches in the where it is composed of two 8-inch open joint tile pipes. It i not less than 7 feet below the surface of the ground at any poi

The immediate region is uninhabited, the site occupied by th pumping station being a long narrow triangular tract of land ly the diverging east and west bound tracks of the Boston and Mai and a small stream entering the river some 250 feet below. T about ¼ mile long and 400 feet wide at the pumping station. Th very flat, and the general surface is at an elevation of not more t above the normal stage of the river. At unusually high water it and during at least one flood, said to have been due to ice in the water rose to a height of several feet above the tops of the wells.

Into the southerly end of this triangular tract a small stream through a culvert in the westbound railroad track and spreads ou flat ground toward the wells. It has no outlet through the embai the eastbound track.

In the dry season the water from this stream sinks into the gr pocket or depression some 300 feet south of the wells. During fresl however, the water overflows into the low area around the wells. I is discharged into a culvert and finds its way into the tributary l pumping station, but a large part sinks directly into the ground at The water from this small stream entering the flats south of the well ject to gross pollution from a slaughter house, refuse dump and hogp are located directly on it at a point about ¼ of a mile east of the At the time of inspection this slaughter house and the immediate s ings were in an extremely insanitary condition. Remnants and part casses were lying on the surface of the ground and there was an accu of almost every conceivable kind of refuse and waste, both organic organic, within the enclosure. A hogpen adjoining the slaughter ho

tended down the steep slope to the stream. The physical effects of the drainage from these premises was evident in the appearance of the water in the stream below.

The results of the analyses of samples of the public water supply of Hoosick Falls in parts per million are given below.

REPORT OF WATER ANALYSIS FOR VILLAGE OF HOOSICK FALLS

Laboratory number	....	B-4760 C-2816	B-5969 C-3746	B-6624 C-4307	B-6960 C-4591	B-7368 C-4246
Source	Tap public supply	Tap	Tap	Tap	Tap	Tap
Collected on	12/16/10	2/26/11	10/2/11	12/15/11	1/29/12	3/11/12
Color	Trace	Trace	5	Trace	Trace	Trace
Turbidity	Clear	Clear	Trace	Clear	Clear	Clear
Odor, cold	....	1 v.	1 v.	1 v.	1 v.	1 v.
Odor, hot	....	1 v.	1 v.	1 v.	1 v.	1 v.
Solids, total	133	94	165	120	99	115
Loss on ignition	....	35	25	17	14	31
Mineral residue	106	59	140	103	85	84
Ammonia, free	.006	.018	.004	.008	.016	.018
Ammonia, albuminoid	.056	.014	.018	.016	.026	.043
Nitrites	.002	.002	.001	.001	Trace	Trace
Nitrates	0.50	0.80	0.20	0.60	0.72	0.60
Oxygen consumed	1.2	3.70	1.20	0.50	0.30	1.10
Chlorine	4.5	4.75	3.5	3.75	3.37	3.75
Hardness, total	102	55.7	82.9	60	60	60
Alkalinity	97	53	81	57	57	51
Bacteria per c.c	8	1,200	80	40	250	350
B. coli type	10 c.c. — 1 c.c. — 0.1 c.c. —	10 c.c. 2+1— 1 c.c. — 0.1 c.c. —	10 c.c. — 1 c.c. — 0.1 c.c. —	10 c.c. 1+2— 1 c.c. 0+3— 0.1 c.c. 0+3—	10 c.c. 2+1— 1 c.c. — 0.1 c.c. —	10 c.c. 1+2— 1 c.c. — 0.1 c.c. —

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct: 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

From these analyses it is seen that this supply, though a relatively hard water, is free from turbidity and color at all seasons. The content of nitrogenous organic matter in the form of free ammonia and albuminoid ammonia is relatively low, indicating that there had been little or no "proximate" pollution of the water by objectionable organic matters. That there has been some appreciable distant pollution of the water by nitrogenous organic matters, followed by a natural oxidation and purification, is suggested by the considerable amount of nitrogen in the oxidized form of nitrates and the relatively high value for chlorine.

The bacteriological results vary considerably. Three of the samples show rather high total counts for a ground water supply. The other three exhibit a satisfactory total bacterial content. The examination for the B. coli type of fecal organisms would indicate that there has probably been no contamination of the supply by direct animal pollution.

These analyses are consistent with the conditions surrounding the source of the public water supply. The ground water supplying the wells has undoubtedly been subject to more or less organic pollution at sometime in its history. From the nature of the ground through which all the water supplying the wells would necessarily have to flow under ordinary circumstances a considerable natural purification would be expected. Undoubtedly the greater part of this pollution has come from the polluted stream passing the slaughter house. Some of this pollution, however, may have had its origin in the feeder line extending under the railroad at times of flood when river water was standing over the pipe. There is also a very probable possibility of human organic matter having come in close proximity to the supply from the discharges of toilet rooms on trains passing along the eastbound railroad track. In case of any failure of the soil to effect a natural purification of all water

filtering through to the ground water these human wastes danger to the safety of the public water supply than an; pollution previously mentioned.

In view of the above conditions regarding the collection the public water supply of Hoosick Falls, I beg to submit clusions:

1. That the public water supply of the village of Hoo a hard water, has with few exceptions been of fair sa such times as examined by the State Hygienic Laborat

2. That there are times when polluted water enters supplying the wells, but that contamination of the wells prevented by the natural agencies of filtration through

3. That the greater part of this organic pollution con water overflowing the surface of the ground at or near t ground water is probably affected at times by the poll and possibly by human wastes from passing trains.

In view of the above conclusions I would submit the f mendations (A) and (B):

A. That should the present wells be retained as the water supply the opportunities for pollution as discusse rected by —

1. a. Removing the slaughter house and pigpen to s from the stream and maintaining the surroundings in s condition as to prevent direct pollution of the water, or

b. By diverting this polluted stream in such manner as freshet water from flooding the low ground at or near the

2. Filling in and grading the surface of the ground ar to eliminate any low spots or pockets where surface wat and sink into the ground near the wells.

3. Raising the masonry walls of the wells at least 3 f ground surface after grading.

4. Taking the necessary means to prevent flood water fr tary north of the pumping station from approaching the low the wells.

5. Construction of ditches or otherwise draining the surfac the railroad embankment in such a manner as to eliminate tl of pollution from passing trains dangerously affecting the ing the wells.

B. That should it be found impracticable to remove or sources of possible pollution of the wells constituting the pre of water supply, that a new source of public water supply which will be safe and acceptable and free from the oppor pollution which are inherent to the present source of supply.

In conclusion it is evident from the investigation of the public ply of Hoosick Falls that the location of the sources of this supp well chosen. While the wells are in an uninhabited part of the v are close by a main trunk of railroad travel. In such a location t are not only subject to the possibility of contamination by wastes numbers of passengers on trains but also from accidental or care tion by employes of the railroad or others who have occasion to the embankment on foot.

The possibility of pollution from this source and other sources dis this report can be greatly lessened and possibly minimized by such indicated above under recommendation (A), together with constant on the part of those directly in charge of the supply. In order, ho largely eliminate all possibility of dangerous contamination it wou ably be necessary to seek another source of public water supply.

Respectfully submitted,

THEODORE HORTO

Chief En

Copies of the report were transmitted to the committee on water the local board of health.

JAY

ALBANY, N. Y., *June* 6, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon a recent investigation by the engineering division of the public water supply of the village of Jay.

Jay is an unincorporated village located in the northern part of Essex county in the Adirondack mountains. It is on both banks of the Ausable river 9 miles nearly due east of Mt. Whiteface and 27 miles southeast of the city of Plattsburg. The present population is estimated at about 300, which is increased during the summer season to about 375.

The public water supply is obtained by gravity flow from a mountain stream known as Rocky Branch. This stream rises on Jay mountain 5 miles southeast of the village at an elevation of 3,400 feet above the sea level. It flows in a general northwesterly direction, emptying into Ausable river about half a mile below the bridge at the village.

The intake is at a point about 2 miles south of the village at an elevation of about 900 feet. The flow is by gravity from the intake direct to the distributing system in the village. There are no distributing reservoirs or stand pipes.

The distributing system consists of about 4 miles of water mains, including the pipe line from the reservoir. The mains are from 2½ inches to 8 inches in diameter. The average pressure in the village is about 80 pounds per square inch.

The waterworks were built in 1905 under the provisions of the Town Law for the establishment of a fire district. The works were designed by Mr. E. M. Clifford and were built by and are now under the direction of a board of water commissioners. Mr. Ezra Fairbanks is chairman of this board.

Practically all of the inhabitants of the village are served by the public water supply. There are no gaugings or records of the average daily consumption of water. There are about 60 service taps on the system, none of which are metered.

The investigation of the public water supply at Jay was made on May 24, 1912, by Mr. A. O. True, assistant engineer of the Department. On the inspection of the works the engineer was accompanied and assisted by Dr. L. J. L. Avery, health officer of the town of Jay, and Dr. A. J. Merrill, a member of the board of water commissioners of the village of Jay.

The water is diverted at a dam across the Rocky Branch 2 miles south of the village. The head works consist of a wooden dam about 40 feet long and 6 feet high, a shallow impounding reservoir of natural contour and an intake chamber with wooden superstructure. There are two large flush channels or ports in the up stream face of the dam which are opened by hand for the purpose of sluicing out sand and gravel and other matters deposited in the reservoir by the stream. The reservoir formed by the dam is about 100 feet long and averages some 80 feet wide and 2 feet deep. The upper end is shoal because of the deposits of sand and gravel brought down the stream. This material has formed a small island in the upper end of the reservoir about 40 feet long by 20 feet wide.

The intake chamber is at the south end of the dam on the left bank of the stream. The water enters through a screened opening in the lower part and passes through three inclined screens, the first two said to be of about 1/10 inch and 1/20 inch mesh respectively and the third of fine wire cloth. After screening the water passes directly to the village through a cast-iron pipe line.

The watershed above the dam has a total area of about 8.5 square miles. The whole tributary area is mountainous, forming an almost circular basin surrounded on every side by mountain peaks, the water finding exit through a narrow gap on the westerly side. The slopes are precipitous and largely wooded, the woods being intersected in all directions by a great number of small tributaries to the main stream.

There is practically no permanent population upon th are three spur roads running into the watershed upon some houses, but only one is occupied permanently. removed from the stream. In the winter season, howe to be some 40 to 50 men on the watershed engaged in c the neighboring pulp mills. A number of horses are i and trouble has been experienced by the town board c horses which have been left on the watershed of the vill

The results of analysis of samples of water collect water supply of this system at the time of inspection State Hygienic Laboratory are given below in parts pe

REPORT OF WATER ANALYSIS FOR VILLAGE

Laboratory number	
Source	
Collected on	
Color	
Turbidity	
Odor, cold	
Odor, hot	
Solids, total	
Loss on ignition	
Mineral residue	
Ammonia, free	
Ammonia, albuminoid	
Nitrites	
Nitrates	
Oxygen consumed	
Chlorine	
Hardness, total	
Alkalinity	
Bacteria per c.c	
B. coli type	

Results are expressed in parts per million. + Present. — Absen
Abbreviations used to describe odors of water: 0, none; 1, very 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; m, musty; v, vegetable.

Obviously it is not possible to draw any conclusi quality of this water supply as indicated by chemi analysis except from a study of many more analys and extending over a considerable period of time and seasonal and other physical conditions. These few a however, that this supply is a characteristic upland in color and usually free from suspended matters. organic stain derived from the smaller vegetable gr watershed. The Rocky Branch is a mountain stream the freshet times it carries varying amounts of tu of the comparative small storage afforded at the d passes the screens and affects the water flowing in tl is a soft water as would be expected from the ph watershed, the streams being cut into, geologically composing the Adirondack mountains. These rock gneiss and norite, and there is little limestone to water.

The value of chlorine in the sample for chemical this region and would indicate freedom from any time the sample was taken. The nitrogenous orga in the ammonias and the nitrites. The amount of

for a surface water. The amount of albuminoid ammonia is moderate. Only a trace of nitrogen as nitrites was found in the water. The figures indicate but a moderate amount of nitrogenous organic matter, which was not undergoing any active bacteriological oxidation. The value for nitrates or mineral nitrogen is low.

The result of "oxygen consumed" is relatively high. This gives indication of the amount of carbonaceous organic matters. It is probably due to the vegetable matter in solution or colloidal solution derived from the plant and tree life on the watershed, and is the cause of the color found in this sample.

The bacteriological results are inferior and somewhat at variance with the chemical analysis. The total number of bacteria as given in both samples is somewhat high even for a surface collected water. Nine hundred and fifty bacteria per c. c. is considered a high count for an unfiltered surface impounded water and 325 per c. c. is considered somewhat higher than moderate for an unfiltered surface water. The results of the tests for the B. coli type of fecal bacteria are fairly satisfactory. One positive test for this type of bacteria was obtained, however, in one of the samples in as small a volume of the water as 1 c. c. This would indicate a pollution of the water at some time by animal organic matter. This effect could have been produced by barnyard drainage or parts of dead animals coming in contact with the water. It is possible that it was caused accidentally by organic matters of human origin.

The results of the analysis are consistent with the conditions existing on the watershed at the time of inspection. There is little permanent occupation of the watershed by men or domestic animals. There are one or two permanent dwellings well removed from the tributary streams, which, under ordinary circumstances, would not be expected to have more than a slight effect on the sanitary quality of the water supply taken from the stream below. There are no permanent sources of pollution. In the winter season, however, the temporary population becomes a menace to the sanitary quality of the supply. Any temporary occupancy of a watershed becomes a menace to water supplies derived therefrom. The very nature of this occupancy becomes an ever present danger to the water. There are usually no permanent or sanitary means provided for the safe disposal of the wastes from the men or animals engaged in the work. Especially on a hard and steep mountain side are the conditions favorable for the washing into the streams of fecal or other dangerous wastes which quickly reach the reservoir at the intake to a public supply.

From a consideration of the conditions surrounding the source of public water supply for the village of Jay, I beg to submit the following conclusions:

1. That the water derived from the watershed of Rocky Branch and delivered to the village of Jay is usually of excellent physical and aesthetic quality. Under the present arrangement of works, however, where little quiescent sedimentation is afforded there is probably some objectionable turbidity at certain seasons.

2. That the present shallow reservoir at the dam on Rocky Branch is inadequate to furnish capacity for freeing the water of objectionable suspended matter by sedimentation or reserve supply for fire protection.

3. That while under ordinary circumstances the water is of reasonably good sanitary quality there are times when its safety is menaced by the population engaged in work upon various parts of the catchment area.

In view of these conclusions I would submit the following recommendations:

1. That the board of water commissioners have regular and frequent inspections made of the whole watershed of Rocky Branch above the intake dam, to appraise themselves of and abate any direct and permanent pollution of the stream or tributaries of any careless or wilful pollution.

2. That all lumbering or other operations upon the waterworks intake be forbidden except under t of the board of water commissioners and in such m any dangerous pollution of the water, and that if i the board apply to this Department for the enactior tions under the Public Health Law for the sanit public water supply.

3. That the board of water commissioners of th reservoir capacity of the waterworks, preferably of a distributing reservoir to receive the water fro this reservoir to be of such capacity and having provide storage for sedimentation and pressure for fire protection.

Respectfully submi
THEODO

Copies of this report were inclosed in letters addr water commissioners and to the local board of health taken to carry out the recommendations contained in

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LARCHMONT

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of Heal*

DEAR SIR: — I beg to submit the following report o of the public water supply furnished to the village Larchmont Water Co.

Larchmont is an incorporated village located in t Westchester county on Long Island sound and about 1 city, on the New York, New Haven and Hartford Railr lation is about 2,000 which is said to increase to abo time.

The water for the village is obtained from the wat river about 2½ miles northwest of the village. It is the water being impounded in a storage reservoir for across the stream about 500 feet west of the highv from the village. These waterworks are owned and mont Water Co. There are two storage reservoirs o lower reservoir just mentioned. One of these is som above the lower dam and the second is a small pon the lower dam. From the intake at the dam of the l flows by gravity to the mechanical filters at a poin just east of the highway mentioned above. After p ters the water is delivered directly to the village t filters are housed in a substantial one story masonry

These filters are of the mechanical vertical press commercially known as the Federal filter. There ar tank 10 feet in diameter by 6 feet high, located ab the filter house. The filters are operated from a ra valve stands which are connected with their respe stems. Potassium aluminum sulphate is used as a under pressure from a cylindrical alum pot in serie ing a circuit between two points on the raw wat amount of alum in lump form is placed in this pot hole in the top. The amount of alum used is said lbs. net weight each every two weeks, which is app rate of 1½ grains per gallon to 3¾ grains per gallo sumers respectively. The filters are washed once a

turbidity of the water would indicate a more frequent washing was necessary. The washing is accomplished by a flow of raw water under about 14 lbs. per square inch pressure through the collecting system in a reverse direction, that is, opposite that which obtains during filtration. There is no provision for agitating the sand other than that which results from the reverse flow of water during washing. The washing is continued until the waste water appears reasonably clear and without color as it passes from the waste water pipe. After washing and the filter is again in operation the water is filtered to waste for several minutes before the filter is again connected with the pipe line to the village. The filtering material consists of coke, sand and gravel in the order named from top to bottom of the filtering layer. The total filtering area is approximately 160 square feet. Inasmuch as these filters are operated on the direct system, that is, the water passes directly from the filters to the village, the maximum rate of filtration would be determined by the maximum hourly rate resulting from the draft on the system in the village. Taking the population at 2,000 consumers and the average daily consumption at 75 gallons per capita per day and the maximum hourly rate at 125 per cent. of the average rate, the maximum rate of filtration would be approximately 52,000,000 gallons per acre per day. For a total population of say 5,000 this maximum rate would be increased to approximately 130,000,000 gallons per acre per day. These are not excessive rates for a mechanical filter.

The average daily consumption of water is estimated at 150,000 gallons to 375,000 gallons. There are about 400 service taps and the system is pretty fully metered. The average pressure on the mains in the village is approximately 55 lbs. per square inch.

On May 24, 1911, at the request of the local board of health an inspection of the watershed of this supply was made by this Department with especial reference to the serious pollution of the watershed by reason of the presence on the watershed at that time of many laborers engaged in the construction of N. W., W. & Boston R. R. which follows the course of the Sheldrake river for a considerable distance. The report of the chief engineer upon this investigation was submitted to you under date of May 25, 1911. The several recommendations which are made in this report and approved by you were pretty generally carried out by the water company and the local officials interested in the quality of the supply. The following recommendation in this report has not as yet been carried out by the water company although they have been requested to do so both by this Department and by the local board of health.

"That the Larchmont Water Company make application to this Department for the enactment of rules and regulations under sections 70, 71 and 73 of the Public Health Law for the sanitary protection of the public water supply of the village of Larchmont."

At the further request of the village authorities a second investigation of the public water supply from the Sheldrake river was made on October 28, 1912. This investigation was made by A. O. True, assistant engineer, in company with Dr. Ellsworth J. Smith, health officer of the village of Larchmont. Samples of water were collected from various parts of the system at this time and the results of analyses of these samples of water together with the results of analyses of samples of water collected by and examined at the State Hygienic Laboratory during 1910 and 1911 and 1912 are given in the table below. I am informed that the Lederle Laboratory of New York city collects and analyzes samples of this public water supply for the Larchmont Water Company once a month.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as—: Free ammonia	Nitrogen as—: Albuminoid ammonia	Nitrogen as—: Nitrites	Nitrogen as—: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+=present, —=absent): 10 c.c.	B. Coli Type: 1 c.c.	B. Coli Type: 1-10 c.c.
....	Larchmont	Westchester	Reservoir, unfiltered	7/ 4/10	20	Tr.	....	....	71	....	40	.008	.178	.003	0.04	4.70	3.75	35.1	26	4,400	+	+	—
....	Larchmont	Westchester	Tap, public supply	9/21/10	12	2	....	....	78	....	33	.016	.214	Tr.	0.04	3.68	4.63	31.2	27	200	+	+	—
....	Larchmont	Westchester	Tap, public supply	12/ 1/10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	800	+	—	—
B-4458 C-2557	Larchmont	Westchester	Tap, public supply	1/ 4/11	20	2	1 v.	1 v.	100	33	67	.122	.142	.002	0.50	3.50	7.00	45.7	26	000	3+0—	3+0—	0+3—
B-4880 C-2907	Larchmont	Westchester	Tap, public supply	3/ 2/11	Tr.	Cl.	1 v.	1 v.	101	40	61	.010	.046	.002	0.40	2.00	5.25	33.5	14.5	450	—	—	—
B-5151	Larchmont	Westchester	Tap, public supply	5/10/11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	110	1+2—	0+3—	0+3—
B-5459 C-3371	Larchmont	Westchester	Tap, public supply	6/23/11	10	5	1 v.	1 v.	112	22	90	.026	.134	.001	0.10	4.20	6.00	54.3	24	1,500	2+1—	0+3—	0+3—
B-6114 C-3868	Larchmont	Westchester	Tap, public supply	10/17/11	2	Cl.	1 v.	1 v.	94	22	72	.012	.106	.001	0.24	0.90	5.75	31.2	18	650	1+2—	1+2—	0+3—*
B-6507 C-4197	Larchmont	Westchester	Tap, public supply	12/5/11	10	Cl.	1 v.	1 v.	106	22	84	.004	.060	.001	0.60	2.40	5.37	29.9	10	50	—	—	—
B-6835 C-4490	Larchmont	Westchester	Tap, public supply	1/17/12	10	Cl.	1 v.	1 v.	93	16	77	.016	.034	Tr.	0.52	1.10	5.50	45.7	16	60	—	—	—
B-7181 C-47[illegible]	Larchmont	Westchester	Tap, public supply	2/21/12	Tr.	Cl.	1 v.	1 v.	86	8	78	.008	.028	.001	1.02	1.40	5.75	35.1	14	30	1+2—	0+3—	0+3—

From an inspection of these results it can be inferred that the filters are effecting a satisfactory removal of color and turbidity from the raw river water. No very definite comparison can be made because of the few analyses at hand of the raw water as delivered to the filters but the results obtained from the samples of filtered water collected in the village are reasonably satisfactory in the main, especially in reference to removal of turbidity. The values for free and albuminoid ammonia and oxygen consumed also appear to be materially reduced by filtration. The bacteriological efficiency of the filters appears to be less satisfactory. The total numbers of bacteria are very variable and at times high, although it must be noticed that some of the samples were more than 24 hours in transit to the laboratory. However, the results are not satisfactory for a filtered water supply and are rather strong evidence of inefficiency of the filters at times. There is also an occasional appearance of the B. coli type of fecal organisms in as small test volumes of the filter water as 1 cubic centimeter. It is unlikely that these organisms multiplied in the samples during transit to the laboratory. The samples of unfiltered water from the Sheldrake river would indicate that this stream is at times subject to considerable turbidity and high color and carries much pollution from the populated areas along its banks and tributary to it above the intake.

The inspection of the watershed shows that there is a considerable and growing opportunity for pollution of the waters of the Sheldrake river. The serious pollution of this stream during the occupancy of the watershed by numbers of men engaged in the construction of the N. Y., W. & Boston R. R. has been largely abated and controlled by reason of the completion of the major construction work and the patrolling of the river by the village and by the water company. This danger is being superseded, however, by the permanent and ever increasing opportunity of pollution of the river and water supply by the occupancy of the watershed by new settlements and communities which are being encouraged by new railroad facilities from and to New York city. Already two new stations have been built on the railroad and land improvement has commenced. The Quaker Ridge station is on the left bank of the Sheldrake river about 1¼ miles above the lower reservoir. Extensive improvements are being made at the time of the inspection at this station in the way of grading, building approaches and storm water sewers, and diverting the course of the river. The work is being done on broad lines. The storm sewers are arranged to discharge into the river. In the vicinity of this station some new houses have been built in the past year and a local water supply has been secured from deep wells and is being distributed by pumping to a reservoir.

The other station on the watershed is about ¾ of a mile above Quaker Ridge, at the intersection of highways and near the left bank of the stream. The toilet rooms at this station were said to be connected with a cesspool whose exact location could not be learned. The electric cars and trains have only been placed in operation on this road within a very few weeks, and it is said that the toilet rooms have not as yet been put in use. The road bed of the railroad is near and on the river at certain points and crosses it above the Dickeman pond. There are several culverts under the railroad which discharge storm water and surface water and drainage from highways into the river.

From this necessarily brief investigation of public water supply I submit the following conclusions:

1. That the Sheldrake river above the point from which the public water supply of the village of Larchmont is derived is subject to a considerable direct pollution from the population occupying the watershed in proximity to the stream.

2. That because of the developments which are being rapidly made subsequent to the opening up of these areas for residential purposes by the construction of the railroad the population on the watershed of the public water supply will rapidly increase which will be accompanied by an increased amount of pollution of the river by animal and other organic wastes resulting from household and industrial economy.

3. That the present filter plant is effecting a removal of physical impurities but that its efficie bacteria is at times low and unsatisfactory.

I would recommend

1. That the Larchmont Water Company apply t the enactment of rules and regulations for the san public water supply of the village, in order that tl from the growing population may be prevented as

2. That immediate steps be taken by the Larchm increase the efficiency of the filter plant, and, if nec expert supervision, hypochlorites of lime to the ef an additional safeguard against infection of the v

Respectfully submitte

THEOD

Copies of this report were transmitted to the Larch and to the local board of health.

LASALLE

ALBANY, N. Y.,

EUGENE H. PORTER, M.D., *State Commissioner of Heal*

DEAR SIR: — I beg to submit the following report on the public water supply of the village of LaSalle.

LaSalle is an incorporated village located in the south ara county near the Niagara river and some 2 miles e the city of Niagara Falls. It is a growing residentia at the present time a population of about 1,500.

The present public water supply for this municipality river. The water is pumped from this stream at a poin ⅛ of a mile above the confluence of the Little river wit pumping station is located on the right bank of the riv of the village. The water is taken from an intake sc bank of the stream and pumped into the distributing against a pressure maintained by a steel stand pipe o cent to the pumping station. This tank is elevated ab ground level and is about 16 feet in diameter by 40 fe ported by a brick substructure. The water is raised b pump belted to a 25 horse-power electric motor. This in a one-story brick building which is about 30 feet l The average pressure in the mains is about 30 lbs. to th

Up to within a short time ago these works were owne LaSalle Water Works Company, of Niagara Falls. I that these works have been taken over by the municipali were in operation at the time of the inspection, contra let for the construction of a pipe line to supply the villa from the Niagara Falls works of the Western New York

The inspection of the present supply was made by Mr. engineer, on November 8, 1912. The assistant engineer assisted by Dr. L. M. Jayne, health officer of the village this inspection samples of water were collected from th intake and from the distributing system for analyses a Laboratory. By means of a launch the Little river wa intake of the waterworks eastward to the Niagara rive narrow channel of the Niagara river averaging not over l about 2 miles in length, lying between the main land and ground known as Cayuga island. It receives water not o river but also from Bergholtz and Cayuga creeks, the la it at LaSalle, below the waterworks intake. The wat

grossly polluted by the sewage from the municipalities of Tonawanda and North Tonawanda which is discharged into the Niagara river from 4 to 6 miles above LaSalle. It is also well known that the Niagara river receives the untreated sewage of the city of Buffalo and other communities on the immediate watershed of Lake Erie, and in an unpurified state is unsafe as a public water supply.

With reference to the public water supply of LaSalle there is also considerable local pollution of the stream above the waterworks intake. Some of this pollution is caused by drainage from privy vaults located along the bank of the river. There is also a pollution of the Little river at a point about 50 feet above the intake by sink wastes discharged directly into the stream through a sewer from several houses near the pumping station.

The results of analyses of samples of water collected at the time of inspection are given below.

REPORT OF WATER ANALYSES FOR VILLAGE OF LASALLE

Laboratory number	B-9054 C-6816	B-9039
Source	Little River at intake	Tap public supply
Collected on	11/8/12	11/8/12
Color	10	....
Turbidity	10	....
Odor, cold	1 v.	....
Odor, hot	1 v.	....
Solids, total	159	....
Loss on ignition	31	....
Mineral residue	128	....
Ammonia, free	.056	....
Ammonia, albuminoid	.098	....
Nitrites	.004	....
Nitrates	0.06	....
Oxygen consumed	3.30	....
Chlorine	6.00	....
Hardness, total	108	....
Alkalinity	96	....
Bacteria per c.c.	96,000	24,000
B. coli type	10 c.c. 3+0—	10 c.c. 3+0—
	1 c.c. 3+0—	1 c.c. 3+0—
	0.1 c.c. 3+0—	0.1 c.c. 3+0—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

These results so reflect the insanitary conditions which are known to exist in this source of water supply by reason of the gross pollution of the Niagara river as to make interpretation needless. The samples were characteristic of the water of Lake Erie, being hard and high in chlorine. The water contained considerable organic matter and was moderately high in turbidity and color. The total numbers of bacteria were excessively high, and fecal organisms of the B. coli type were found in all the volumes taken for examination and in as small quantities of water as 1/10 c. c.

Fortunately there seems to be a general appreciation by the people of the community, partially, at least, as the result of the instruction and warning of the local board of health, of the fact that the present Little river water supply is unsafe for drinking or domestic use in its raw state. In this fact is probably found the explanation of why the use of this water has not been attended by a prevalence of typhoid fever and other water borne diseases. Four cases of typhoid fever have been reported from LaSalle during the year 1912. The existence of this water supply in the distributing mains, however, making it accessible to those who, from carelessness or ignorance of its character, may use it for drinking or cooking purposes is a menace to the health of the village.

In view of the fact that the existing waterworks and t water supply are now under the control of the village, an lage is at present taking steps to procure a supply of pur Western New York Water Company at Niagara Falls, it s sary to make further comment on the present water sup ommendations in the premises except to urge that there carrying out the plans for the abandonment of the pres water supply.

Respectfully submitted,
THEODOI

A copy of this report was transmitted to the local boa

MATTEAWAN

ALBANY, N. Y., N

EUGENE H. PORTER, M.D., *State Commissioner of Healtl*

DEAR SIR: — I beg to submit the following report of a of the public water supply of the village of Matteaw

Matteawan is an incorporated village located in the of Dutchess county about 60 miles north of New Yo tiguous with the village of Fishkill-on-Hudson, the two a thickly populated area on both banks of Fishkill c from Fishkill Landing on the Hudson river southeaster long, narrow spur of the mountains. The present popul is about 7,000 and that of Fishkill-on-Hudson 3,000.

The public water supply is derived by gravity from sheds lying between two ridges of the mountain spur bef more northerly of these, known as the Beacon supply, i over a mile southeast of the village (Matteawan). T the Melzingah supply, adjoins the Beacon on the south miles south of the village. The village of Fishkill-o own distributing system, but receives its water supply f waterworks through a metered connection with the dis the last named village. The State hospital at Matte with water from the village supply until some two years pendent supply derived from wells was installed. Sev also during the present fall there was a shortage of w necessary to supplement the supply by pumping into th kill creek. At the present instance this supply was obt bay of the electric light plant located on the left bank one-quarter of a mile above the village. The village o pump in this station and buys what power is necessary the electric light company.

The distributing system in the village (by "village" i of Matteawan unless otherwise stated) and the pipe line consist of about 10½ miles of cast-iron pipe ranging f inches in diameter. There are about 550 service taps which are metered. About 50 per cent. of the populati public water supply. There is a considerable use of p residential sections. The total consumption of water is e gallons per day, this being the aggregate for both vil pressure in the village is about 95 pounds per squar were installed in 1886 by the Fishkill and Matteawa The works were subsequently taken over by the village at present owned and operated.

The present investigation of these works was made at board of health of the village of Matteawan through th

H. S. Bontecou. The investigation was made by A. O. True, assistant engineer, on October 22, 23 and 24, 1912. He was accompanied and assisted by Dr. Bontecou, Mr. Rogers, president of the board of health, and Dr. Jennings and Mr. William S. Lamont, superintendent of water and sewage works. All parts of both watersheds were inspected and samples of water for analysis were collected for the various parts of the system and from Fishkill creek.

Beacon Watershed.— This watershed, as already stated, lies in the mountains southeast of the village. The headwaters of the main stream issuing from this watershed and flowing into Matteawan creek at a point about half a mile north of the village consists of a natural basin in the granite rock between several of the highest peaks of the ridge known as Beacon Hill. A dam, originally of Ashlar masonry but recently raised 7 feet and strengthened by the use of concrete construction, impounds the water in this basin known as the Beacon reservoir. The dam is about 30 feet high and 300 feet long. The present spillway is at an elevation of between 1,100 and 1,200 feet above mean sea level. When full the reservoir floods an area of about 28 acres. The surrounding watershed above the dam, reservoir inclusive, is about 128 acres or 0.2 of a square mile. The capacity of the Beacon reservoir is given in a report submitted to the village by Mr. Chas. A. Hague on July 6, 1904, as 182,000,000 gallons.

Below the Beacon dam the water from the reservoir runs in the natural bed of the stream, a large part of the way in a deep ravine, a distance of about one-half of a mile, to an intake reservoir formed by a small masonry dam across the stream. The flow line of this reservoir is at an elevation of about 370 feet above mean sea level. The area of the watershed below the Beacon dam and tributary to this intake reservoir, which is known as the "pocket," is about 320 acres or 0.5 of a square mile, making a total watershed for the Beacon supply of approximately 0.7 of a square mile.

The Beacon watershed is uninhabited with the exception of the dwelling occupied by the caretaker, which is located just below the dam, and some half a dozen cottages, located along the contour of the mountains, about an eighth of a mile northwest of the dam. The caretaker's house is about 150 feet from the stream on a moderately steep slope. It has a privy vault about the same distance from the stream. There is a stable on the premises 30 feet from the stream and on a precipitous slope. The cottages for summer occupancy are on a precipitous northern slope of the mountains. These are supplied with water from the Beacon reservoir either by gravity or where necessary by a pump located at the Hotel Beaconcrest on North Beacon hill, something over half a mile west of Beacon reservoir. The sewage from these cottages is in most cases discharged through coil pipes into cesspools, built in and above the underlying rock. Some of these pipes discharge openly on the surface. There are a few privy vaults among these cottages. The streams tributary to the "pocket" are not less than a quarter of a mile away. A mountain road follows the right bank of the stream from the "pocket" to the Beacon reservoir. On the lower part of the watershed the ravine on the right bank of the stream is some 50 feet deep and too steep for vegetation, presenting an eroded bank below the road. This exposes clay, and during heavy rains causes turbidity of the water from the Beacon supply.

At the time of inspection the Beacon reservoir was practically empty, there being only a few inches of water over the outlet gate. The bottom and sides of the reservoir were in fair condition. There are a considerable number of stumps remaining on the bottom, but they are small and can be easily grubbed. There is considerable accumulation of mud in the deepest part of the reservoir behind the center of the dam.

Melzingah Watershed.— This watershed adjoins the Beacon on the southwest. It is about two miles in length and averages about three-quarters of a mile in width. The main stream flows into the Hudson river at a point one mile below the mouth of Fishkill creek. The original impounding reservoir was located about a mile above the mouth of the stream. It was formed by an earth dam with masonry core wall across the valley. In 1897

this dam was carried away in the night time, resulting in several deaths and considerable damage in the settlement near the mouth of the stream. The failure is said to have been caused by inadequate spillway capacity, which resulted in overtopping of the earthwork. This dam never was rebuilt, but a new earth dam has been constructed at a site about an eighth of a mile below. This dam is provided with a rubble masonry spillway at its northern extremity. When full this reservoir covers approximately a little more than half an acre. It is said to be some 15 feet deep at the deepest point when full. A very approximate estimate of its capacity would be 1,500,000 gallons.

The area of watershed tributary to this reservoir is about 800 acres or 1.25 square miles. It is for the most part wooded.

In the extreme upper and northern part of the watershed there are some ten cottages of the Mt. Beacon cottage colony, which drain into the Melzingah watershed. These are supplied with water from the surface pipe system, as explained in the case of those cottages in the Beacon watershed. The sewage is discharged onto the watershed either directly or indirectly through cesspools. The sewage from Hotel Beaconcrest and the Casino on the premises is discharged into the watershed through a coil pipe, which has an outlet about 100 feet south of the hotel and some 200 feet east of the watershed line. These outlets are all on rocky precipitous slopes, but probably in no case within 1,000 feet of any of the streams.

About one-third of the distance from the Beaconcrest hotel to the Melzingah reservoir is the property of the Monarch Spring Co. The spring is situated some 100 feet east of the stream, and is protected by a spring house. The water is piped to the bottling house, some 50 feet from the stream on the opposite or western side. But one or two men are employed here. No sanitary conveniences could be found for their use. There was an accumulation of horse droppings near the bottling works and about 35 feet from the stream.

Approximately midway down the watershed there is an upland farm, known as the Gordon farm. There are two dwellings on this farm, both located west of the stream. The upper and larger house is said to be practically unoccupied. It is some 200 feet from the stream. It has a surface privy vault, about the same distance from the stream, and on a moderate slope. The barns are below the house and nearer the stream. In the barn yard there is some accumulation of manure and the drainage is into the stream on a moderately steep slope along a lane used at some time as a watering place for cattle. There are said to be no cattle on the farm now. There are a few sheep at times housed in pens in one of the barns. One horse was seen at large and went to the brook to drink at the time of inspection. The other dwelling is below the barns. Although this house is near the stream the drainage from this site is down a long and gentle slope, parallel to the stream discharging into it at some distance below. The privy vault at these premises would have to drain through this indirect drainage line. The premises and the privy vault were in an insanitary condition at the time of inspection. There is a chicken house on the top of a steep slope, forming the bank of the stream just below the house.

The roadway from the Gordon farm to the Monarch spring and the roadway below the farm follows closely to the right or western bank of the stream. There were accumulations of horse manure along these roads.

The results of the analysis of samples of water taken from various points of this waterworks are given in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as—: Free ammonia	Nitrogen as—: Albuminoid ammonia	Nitrogen as—: Nitrites	Nitrogen as—: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+=present, —=absent): 10 c.c.	B. Coli Type: 1 c.c.	B. Coli Type: 1-10 c.c.
B-5652 C-3527	Matteawan...	Dutchess......	Mt. Beacon Res. springs.	7/31/11	5	Cl.	1 v.	2 v.	70	18	52	.004	.030	.001	0.10	1.50	3.00	32.5	18	250	3+0—	2+1—	0+3—
B-6103 C-3858	Matteawan...	Dutchess......	Tap, Jas. Sullivan hotel.	10/18/11	10	2	1 v.	1 v.	40	17	23	.014	.036	.001	Tr.	0.30	2.00	22.1	21	200	3+0—	1+2—	0+3—
C-4080..	Matteawan...	Dutchess......	Brook above "pocket".	11/20/11	Tr.	Tr.	1 v.	1 v.	36	6	22	.020	.062	.001	Tr.	0.90	2.25	21.5	12	......	......	......	......
C-4079..	Matteawan...	Dutchess......	Tap, public supply.....	11/20/11	Tr.	Cl.	1 v.	1 v.	35	8	27	.022	.050	Tr.	Tr.	0.70	2.50	22.1	12	......	......	......	......
B-6816 C-4474	Matteawan...	Dutchess......	Tap, public supply.....	1/15/12	Tr.	Tr.	1 v.	1 v.	33	10	38	.024	.068	Tr.	0.04	1.10	1.82	12.7	.....	50	1+2—	0+3—	0+3—
B-7147..	Fishkill Landing........	Dutchess......	Tap, Hotchkiss house...	3/19/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	50	1+2—	0+3—	0+3—
B-7902 C-5411	Fishkill Landing........	Dutchess......	Tap, public supply.....	4/29/12	Tr.	Cl.	1 v.	1 v.	36	11	25	.002	.036	Tr.	Tr.	1.60	1.37	20.8	13	60	—	—	—
B-8412 C-5890	Fishkill Landing........	Dutchess......	Tap, store of P. Green...	8/26/12	7	Cl.	1 v.	1 v.	25	10	15	.002	.014	.001	0.06	1.40	1.75	9.5	6	14,500	2+1—	1+2—	0+3—
B-8938..	Matteawan...	Dutchess......	Gordon brook above Monarch spring......	10/24/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	13,000	3+0—	3+0—	0+3—*
B-8939 C-6126	Matteawan...	Dutchess......	Gordon brook below Gordon farm.........	10/24/12	20	5	1 v.	1 v.	64	17	47	.012	.033	.001	0.06	2.80	5.00	23.4	7	5,300	3+0—	2+0—	1+2—*
C-6125..	Matteawan...	Dutchess......	Inlet to "pocket"......	10/25/12	5	5	1 v.	1 v.	47	10	37	.018	.070	.003	0.06	1.40	3.75	22.1	13	......	......	......	......
B-8941..	Matteawan...	Dutchess......	Inlet to "pocket"......	10/24/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6,700	3+0—	3+0—	0+3—*
B-8940 C-6127	Matteawan...	Dutchess......	Fishkill creek above Embroidery mill dam...	10/25/12	50	5	2 a.	2 a.	110	30	80	.034	.226	Tr.	0.16	7.80	4.00	80.0	41	17,500	3+0—	3+0—	3+0—
B-8942 C-6128	Matteawan...	Dutchess......	Fishkill creek at electric light plant forebay....	10/25/12	30	5	2 v.	2 v.	111	31	80	.026	.212	Tr.	0.10	7.40	4.00	81.4	40	16,000	3+0—	3+0—	3+0—

* More than twenty-four hours in transit.

The physical character of the samples collected from the distributing system during 1911 and 1912 is satisfactory. Also chemically these samples are satisfactory though somewhat higher than normal in chlorine — a condition which is indicative of an animal pollution of the water at a considerable time before the collection of the sample during which there has been a natural purification of the water. All the samples, except those taken from Fishkill creek, show a relatively low amount of hardness — indicating that the upland supplies are soft waters.

The bacteriological results are very variable. Some of the samples collected from the distributing system during 1911 and 1912 show satisfactory results with low total numbers of bacteria and the absence of fecal organisms in any but large test volumes. The samples of July 31, 1911, and October 18, 1911, while not showing high numbers of bacteria, contained fecal bacteria of the B. coli type in as small volumes as 1 cubic centimeter. The sample from a tap on the distributing system collected on August 26, 1912, exhibits an excessively high total count and the presence of the B. coli type in one of the 1 c. c. volumes.

The physical and chemical results of the analysis of the samples collected at the time of inspection from Melzingah and Beacon watersheds are satisfactory except that they have high chlorine values. Bacteriologically these samples are unsatisfactory and indicate animal pollution of the water at the time that they were collected. The total counts are excessively high, but may have been increased from the actual count at the time of sampling by delay in transmission to the laboratory as about two days had elapsed before analysis. The B. coli were found in all the one c. c. test volumes of the water from the Gordon brook, and in one of the 1/10 c. c. volumes of samples from below the Gordon farm. The water taken from the Beacon supply at the "pocket" also showed B. coli or its type in the 1 c. c. test volumes.

The analysis of the water taken from Fishkill creek indicated that at that time the water was of satisfactory physical quality though rather high in color and that chemically it was free from any considerable amounts of objectionable organic matter. The number of bacteria was high in both samples and fecal bacteria were exceedingly prevalent. There was little or no difference in the quality of the sample collected above the embroidery mills and that collected below at the electric light plant. This would indicate that the sewage from the embroidery mill which is discharged at the west bank of the creek does not always affect the water entering the racks in the forebay of the electric light plant on the east bank. Further investigation would probably show that at the season of the year it would be necessary to use Fishkill creek as an auxiliary supply, the water would be of reasonably good physical and chemical quality and could be rendered safe by a careful disinfection by minute quanties of hypochlorites of lime or soda.

On July 6, 1904, Mr. Chas. A. Hague, consulting engineer, made to the village the report, already alluded to, on the public water supply problem of the village of Matteawan. Mr. Hague appears to have made a very thorough inquiry into the present and future needs of the village at that time and as the result of his studies made certain recommendations as to the best course to be pursued by the village in providing for an adequate and safe public water supply for a reasonable time into the future. I have not his report at hand, but if I remember rightly, Mr. Hague provided for 20 years into the future (1924) and based his figures on a future population of 13,000 and an average daily consumption of 130 gallons per capita. With such apparently reasonable assumptions he emphasized the scant area of total watershed embraced in the Beacon and Melzingah supplies and the necessity of developing the storage on these sheds to its maximum and pointed out that even though this was done it would be wise to make provision in case of prolonged drought or emergency for a supplementary supply from Fishkill creek and also for subjecting the same to some form of purification. Mr. Hague's principal recommendations are as follows:

> Increase storage of Beacon reservoir to 200,000,000 gallons by raising dam. Developing a storage reservoir on Melzingah watershed to hold 75,000,000 gallons.

Arrange delivery of supply from Beacon reservoir as to avoid soiling of water during heavy rainfall. Provision for pumping and purification of an auxiliary supply from Fishkill creek.

The storage at the Beacon reservoir has been increased as recommended by raising the dam some 7 feet. This was done in 1907 by the addition of concrete masonry on the top and on the down stream face. The dam was strengthened against overturning by the construction of 8 concrete buttresses on the down stream side. As already stated, the storage of the Beacon reservoir is now estimated at 182,000,000 gallons.

The remaining recommendations of Mr. Hague's report, as given above, have not been carried out except possibly the installation of a pump at the electric light station.

A year ago the State Inspector of Docks and Dams, Mr. A. R. McKim, examined the Beacon dam, and as at that time it could not be immediately ascertained whether or not the foundation of the dam was keyed into the underlying rock, he deemed it advisable not to fill the dam within four feet of the spillway until the condition of the foundations could be determined. A considerable loss of storage has resulted from the necessity of following this course together with the fact that there is a considerable leakage which issues through several vertical cracks in the concrete facing on the down stream side of the dam. These leaks are said to have been partially stopped by grouting from the top but there is considerable leakage it is said.

It is said that an estimate of cost for strengthening the dam and facing the up-stream side with concrete in accordance with suggestions of the State Inspector of Docks and Dams, was made by the former village engineer. The estimate for this work is said to have totalled $12,000. The proposition was submitted to the vote of the village together with other improvements with reference to roads and storm sewers. This proposition was voted on at an election last summer and was lost.

About the middle of October the supply of water from the upland watersheds became practically exhausted and it became necessary to start the pump at the electric light plant. Water was pumped from the creek for a period of about a week, when the pumps were shut off on the morning of October 23, 1912, the upland supply having been augmented by two or three inches of rainfall on the 22nd and 23rd.

In addition to the pollution coming from the discharge of sewage into the creek at the embroidery works, there is also opportunity for pollution along the left bank of the creek below these works. There are some six houses along the creek bank which is high and steep at this point. These houses have privy vaults which are located on the streamward slope of the bank and in several instances near the high water mark.

A sewer has been built along the street in front of these houses, which is to receive the sewage from the force main now being constructed to serve the embroidery mills. There is no apparent reason why the houses mentioned above which have the public water supply could not be connected with this sewer.

From this brief study of the conditions under which the public water supply is derived and delivered into the village mains I have come to the following conclusions:

1. That because of the limited area of the watersheds now available for a gravity supply for the village it is necessary that the maximum amount of water shall be conserved upon these mountain watersheds by putting the Beacon dam in a watertight condition and also by providing in a manner and to such extent as shown to be consistent with economy, additional storage upon the Melzingah watershed or upon the Beacon watershed, below the main dam, or both.

2. That because of their proximity and their location at a considerable elevation above the village, their natural physical character with respect to the impervious nature of the underlying granite rock and their precipitous wooded slopes, the Beacon and Melzingah watersheds enjoy excellent advantages for the collection of water of good physical and sanitary quality which can be delivered to the village under a good pressure.

By this it must not be understood that I consider t are not open to the accidental, careless or wilful p such watersheds must be subject and which can onl by frequent and careful inspection.

3. That both the Beacon and Melzingah watershed encroachments of summer residences which have l northern part of the Melzingah and the southwester watershed. These dwellings together with the ho supplied with a system of water supply, and the s water carriage in many instances, as already state the watersheds either directly or indirectly by se From the results of the analyses of samples of these watersheds subsequent to heavy rains it appea is frequently washed into the public water supply a health of the villages using the supply.

4. That there is some pollution from the roads, a possible privy vaults at the Gordon farm, and fron the caretaker's premises below the Beacon dam.

5. That Fishkill creek supply, which will probabl as a supplementary source to be used by the vil drought or after a succession of dry seasons, is sub the population along the banks of the creek and pro at once for purifying or at least "chlorinating" times as its use becomes necessary.

In view of the results of this investigation I now sub ommendations:

1. That the board of trustees of the village no urgent necessity of providing money for placing safe and watertight condition.

2. That the committee on water take up at once of providing additional or new storages on the m order that an early decision may be arrived at a developing these watersheds along the lines indi report of July 6, 1904, with due consideration to for water and the likely future demands.

3. That the sewage now discharged into the m the public water supply from the hotel and cott Beacon be discharged into cesspools located off th in those cases where it is impracticable for indivi of the sewage in this way, an intercepting sewer be or points of disposal off the public water suppl can be disposed of without danger and nuisance.

4. That the privy vaults at the Gordon farm be sanitary condition with watertight removable c sanitary privy also be provided and placed in a Monarch spring.

5. That provision be made by the village to subje supply pumped from Fishkill creek during droug to a process of "chlorination" or other purifica study to be suitable for the conditions.

6. That frequent and thorough inspections be m Beacon and Melzingah watersheds to prevent or opportunities for accidental or careless pollution

7. That should any difficulty be experienced by t ing the mountain watershed in a sanitary condit water supply apply to this Department for the e regulations for the sanitary protection of the pub

Respectfully submitte

THEOD

Copies of this report were inclosed in letters addre on water and to the local board of health urging that s out the recommendations made in the report.

NORWOOD

ALBANY, N. Y., *January 29, 1912.*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation made by the engineering division in the matter of the public water supply of the village of Norwood.

Norwood is an incorporated village located in the northern part of St. Lawrence county. It occupies both banks of the Raquette river and is at the junction of the Rome, Watertown and Ogdensburg division of the New York Central and Hudson River railroad and the Rutland railroad. The present population of the village is about 2,000.

The public water supply of the village of Norwood is obtained from the Raquette river just above the dam of the Norwood Paper Company in the western part of the village, and is pumped to a stand pipe. The pumping station is located in the Norwood Machine Company at the western end of the concrete dam which has been recently erected to supplant an older structure for developing the water power, most of which is utilized by the paper mill on the opposite and eastern bank of the river.

The intake is a 14-inch riveted steel pipe extending about 40 feet into the forebay from the bulkhead of the machine shops. The outer end of the pipe is said to be 10 or 12 feet above the bed of the river and about 12 feet below the ordinary water surface.

This end is inclined downward and is said to have no screen or strainer. The pipe is supported by a weighted crib and the concrete bulkhead. From the intake the water flows by gravity to the intake well below the machine shop.

The pumping equipment consists of two triplex pumps driven by water power. These pumps are 8¼" x 10" and are run continuously at 26 to 30 revolutions per minute The discharge from the pumps averages about 360 gallons per minute. Each pump is provided with a foot valve.

The pumps discharge directly into the mains of the distributing system of the village, and storage and pressure is provided by a standpipe. The dynamic pressure at the delivery of the pumps is 90 pounds per square inch when the standpipe is full.

The standpipe is of steel and rests on a concrete foundation. It is 25 feet in diameter and 75 feet high and of 275,000 gallons capacity.

The distributing system consists of about 6 miles of cast-iron water mains from 4 to 12 inches in diameter. The average pressure in the village is about 70 pounds per square inch.

The waterworks were built in 1903 and are owned and operated by the village. They are under the supervision of a board of water commissioners of which Mr. I. P. Vance is president.

About 85 per cent. of the population of the village is served from the public water supply. There are about 350 service taps of which none are metered. The average daily consumption of water is about 500,000 gallons. Approximately one-half of this is used by the railroad companies.

An inspection of the Norwood waterworks was made on January 11, 1912, by Mr. A. O. True, assistant engineer of this Department. Samples of water for sanitary analyses were collected from the supply as it came from the pumps and from two different points of the distributing system in the village. The results in parts per million of the analysis of the samples and also the results of an analysis of samples previously collected by the State Hygienic Laboratory are given in the following table:

Analytical Data of Water Supplies

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical				Chemical (Parts Per Million)											Bacteriological			
							Odor		Solids			Nitrogen as—						Hardness			B. Coli Type (+ = present, — = absent)		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
B-3067, C-1679	Norwood	St. Lawrence	Raquette river from tap	2/26/10	40	Trace	1 v.	2 v.	62	30	32	012	060	Tr.	.002	14.6	1.00	15.6	13	850	3+0—	3+0—	1+2—
B-4181	Norwood	St. Lawrence	Raquette river from tap	11/11/10	80	10	2 v.	2 v.	63	33	30	.008	.080	.001	0.08	15.1	1.00	28 6	17	450	3+0—	3+0—	1+2—
B-4815, C-2858	Norwood	St. Lawrence	Raquette river from tap	3/10/11	60	Clear	1 v.	1 v.	73	32	41	038	.112	.001	0.16	18 8	0.50	24.7	16	475	3+0—	3+0—	0+3—
B-5998, C-3772	Norwood	St. Lawrence	Raquette river from tap	10/ 5/11	40	20	2 v.	2 v.	80	31	49	.004	.030	002	0.04	16 2	0 50	26.0	15	500	3+0—	3+0—	2+1—
B-6320, C-4045	Norwood	St. Lawrence	Raquette river from tap	11/14/11	80	5	1 a.	2 a.	82	52	30	050	.132	.001	0.04	26.4	1.00	20.8	13	550	3+0—	3+0—	2+1—
B-6792, C-4452	Norwood	St. Lawrence	Tap at pump at public supply	1/11/12	50	1	2 v.	2 v.	57	27	30	012	.106	.001	0.10	13 6	.375	15.6	6	450	3+0—	3+0—	1+2—
B-6793	Norwood	St. Lawrence	Raquette river from tap	1/11/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	210	3+0—	3+0—	0+3—
B-6794	Norwood	St. Lawrence	Raquette river from tap	1/11/12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	230	3+0—	1+2—	0+3—
B-3045, C-1863	Potsdam	St. Lawrence	Raquette river from tap	2/26/10	30	5	1 v.	2 v.	40	15	25	.040	.203	.001	0.20	9.4	0.25	22.1	18	2,100	1+2—	0+3—	0+3—
B-4187, C-2350	Potsdam	St. Lawrence	Raquette river from tap	11/12/10	80	10	1 v.	1 v.	114	55	59	.010	030	001	0.10	15.3	1.25	19.5	17	1,600	3+0—	2+1—	0+3—
B-4816, C-2857	Potsdam	St. Lawrence	Raquette river from tap	3/10/11	50	Trace	1 v.	1 v.	68	33	35	.044	.092	.001	0 16	17.0	0.62	26.0	18	650	3+0—	1+2—	0+3—
B-6000, C-3776	Potsdam	St. Lawrence	Raquette river from tap	10/ 6/11	50	5	1 v.	1 v.	77	33	44	.004	092	001	0.04	9.1	0.62	24.7	19	110	3+0—	3+0—	1+2—
B-6323, C-4044	Potsdam	St. Lawrence	Raquette river from tap	11/14/11	80	5	1 v.	1 v.	69	32	37	.026	136	001	0 06	16.4	0.87	20.8	16	1,200	3+0—	1+2—	0+3—

These results indicate that the water of the Raquette river at Norwood is comparatively soft. It appears to be high in color at all seasons, and though the results for turbidity, with the exception of the October 5, 1911, sample, are low or moderate, it is probable, judging from the amount and character of the wastes discharged into the river, that the turbidity is a very variable factor ranging from a clear water to one which would be considered highly turbid. The amount of organic matter in the water is high as shown by the average results for nitrogen and "oxygen consumed." The high nitrogen is due to the fact that most of the samples contained a considerably too high amount of free and albuminoid ammonia.

The quantity of nitrogen as nitrites and nitrates is low. Such a distribution of nitrogen indicates the presence in the river water of considerable quantities of organic matter from a not far distant source of pollution.

With the exception of the two samples last tabulated the results for number of bacteria per c. c. are somewhat high even for a surface water supply. Under ordinary circumstances a satisfactory surface water supply unfiltered by artificial means should not show more than 300 bacteria per c. c. as determined by standard methods. Yet more unsatisfactory are the results of the tests for fecal bacteria. It will be seen from the table that the B. coli type of fecal bacteria were found in some of the 1 c. c. quantities of all the samples collected for analysis, and in some of the 1/10 c. c. quantities of 5 out of 8 of these samples. While positive results for the B. coli type can usually be obtained from large samples of surface waters which are relatively free from animal pollution, their frequent isolation from as small samples as 1 c. c. or 1/10 c. c. is considered evidence of sewage or similar animal organic pollution.

These chemical and bacteriological results are consistent with what would be expected from a knowledge of the conditions on the Raquette river watershed to be described later. The results may be briefly summarized as indicating a water which is physically high in color and at intervals turbid; chemically, a relatively soft water, but containing a relatively large amount of organic matter of which the nitrogenous organic matter is in quantity and state of oxidation indicative of recent pollution; and bacteriologically, unsatisfactory and corroborating by the high numbers of bacteria and a relatively large number of fecal bacteria at all times, the evidence of pollution found in the results of the chemical analysis.

While it is the policy of this Department, in its efforts to fulfill the requirements placed upon it by the Public Health Law, to examine into the sanitary condition of the water supplies serving the people of the State and to advise relative to the needs for their improvement, it is not possible for it, with the present limited means at its disposal, to make those extended studies of the economic and engineering features which are necessary as a basis for final recommendations. I will therefore confine my conclusions and recommendations, relative to this inspection of the water supply conditions at Norwood, largely to those features pertaining more directly to the public health and convenience of inhabitants of the village.

In the spring and summer of 1908 a sanitary survey of the watershed of the Raquette river was made by the engineering division and a report thereon was submitted by Mr. H. W. Taylor, assistant engineer. (See Twenty-ninth Annual Report, State Department of Health for the year 1908, Vol. II, p. 604.)

The following statistics pertaining to the hydrology of the watershed and the pollution of the Raquette river are taken from the above report.

Total area Raquette river watershed about 1,240 square miles. Estimated total area Raquette river watershed above Norwood, 1,025 square miles.

Estimated total population on watershed above and not including Norwood, 15,400.

Estimated average population per square mile of watershed above and not including Norwood, about 15.

Probable minimum mean weekly flow of Raquette river at Norwood, 870 cubic feet per second.

Population discharging raw sewage into Raquette about 4,000.

Population discharging sewage into Raquette rive above Norwood, about 3,000.

Approximate quantity of industrial wastes dischar above Norwood:

Lime — 9,600 pounds per day.

Sulphur — 13,600 pounds per day.

Wood fibre — 172,000 pounds per day.

Also sawdust from two mills, wash water from t sulphite liquors from mills near Piercefield and th Company three miles above Norwood.

The territory embracing the greater part of the lies in the mountains at the headwaters of the st than forty miles above Norwood. This area is very pollution from sanitary sewage is confined to that rary population which frequents the mountains s season. The effect of this pollution upon the wat the river is greatly lessened by the factor of dis water in the extensive system of lakes upon th The natural processes of purification, however, ca those communities down stream which use the wa ment for drinking and household purposes. Und considerable constant or even intermittent pollu there is always the likely possibility of the mo bacteria being carried for long distances, where tl manifested through the medium of unpurified p

The effect on the sanitary quality of the rive sewage from the sewer system at Tupper Lak shown by the results of the analyses of sample public water supplies of the villages of Potsda in an appended table. The results of the Nor been discussed and I will merely mention here the results of the Potsdam analyses indicate that of the year, the water of the lower Raquette river and contains large numbers of fecal organisms.

I am informed by the local authorities that Norwood do not use the water from the public ing purposes, and that they depend for this sup While the use of wells in a thickly populated c by more or less danger to health, no undesirab from their use in Norwood. The opportunity wells is greatly lessened by the collection of an extensive system of sanitary sewers, thus p ground water which would probably result fr

From a consideration of the investigations chemists and engineers of this Department public water supply of Norwood as at prese river and delivered to the village is at all ti tion by the sewage entering the river above value as a drinking water is seriously inju amounts of industrial wastes, sawdust and b river.

A reasonably good public water supply sh all times to those residing in the communi and reasonably pure water for all househol from the Raquette river at Norwood does n compares unfavorably with the average pul The economics of such a situation are app the installation, operation and depreciation their wants and from which they do not

majority of the inhabitants of the village have in their houses a system of public water supply which is unsafe to use for many purposes and from which disease may be contracted by those uninformed as to its character. Under such conditions the householder has to have recourse to a well, which, if located near a dwelling or other buildings, is liable to pollution, and when at a safe distance from such buildings its use is attended by more or less inconvenience.

Regarding remedial measures which should be taken to improve this water supply, the limited scope of these investigations will only permit general recommendations to be made.

It cannot be denied that the Raquette river offers a nearby and unfailing source of water supply. While the conditions on the river above Norwood as regards the discharge of household sewage may be improved in the near future by the recent and more stringent requirements of the Public Health Law, it cannot be expected that a stream of this size and character, even though direct pollution is largely removed by the installation of reasonably efficient sewage disposal plants, will furnish at all times an acceptable and safe water for public water supply purposes unless subjected to some means of purification.

In the case of large streams, the primary object of the purification of the sewage resulting from the household and industrial economy of a considerable population on the watershed is usually the elimination of nuisances and the conservation of the desirable physical and aesthetic qualities of the water. While works built with such an object in view undoubtedly do lessen the danger of infection of water supplies taken from the stream, they cannot be expected, nor are they usually designed, to safeguard water supplies at all times from such disease causing bacteria as may enter the stream from municipal drainage systems.

The solution of the problems of sewage purification and safe and adequate water supply for any district are matters of engineering economy which can be solved only by a study of the conditions and requirements of each locality. In our present knowledge of the art of sewage and public water supply purification, however, it is usually found that under conditions like those in question, the best economy is secured from the standpoint of public health by such purification of all sewage entering the stream as to prevent nuisances at all seasons together with a relatively high degree of purification of all water supplies taken from the stream. In this way not only is economy secured but the water supplies are protected from chance and uncontrollable pollution which arises from other sources than the sewage discharge.

In the case of the public water supply of the village of Norwood, taken from the Raquette river, and in view of the possible undesirable conditions of taste, odor and color in the water due to the discharge of saw dust, bark, sulphite liquors and other wastes, it would seem that one of the approved processes of filtration, if properly installed and carefully operated, would not only remove a large percentage of the undesirable physical characteristics of the water but would reduce to a minimum the possibility of disease bacteria passing into the village mains.

I beg to submit the following conclusions with reference to the public water supply of the village of Norwood.

1. That the water supply of the village of Norwood pumped from the Raquette river at Norwood is grossly polluted with domestic sewage and trades wastes, and without purification, is not safe for household purposes.

2. That although the exclusion of gross pollution by household sewage along the Raquette river is expected in the near future, this stream cannot be considered a safe and at all times acceptable source of public water supply unless the water is subjected to some efficient means of purification.

3. That the use of private and semi-public wells as sources of drinking water, although such use has not as yet been accompanied by any undesirable effects on the general healthfulness of the village, is neverthe-

ness open to the dangers attendant on the use o
lated communities and is an expense and inconv

In view of these conclusions I now submit the foll

1. That the board of water commissioners of take steps to improve the sanitary quality of th the installation of some approved method o Raquette river supply or by seeking and install quate source of water supply.

2. That a copy of this report be transmitted t board of water commissioners of Norwood.

3. That the village obtain the services of a co investigate the question of public water supp most expedient and economical means of provid and acceptable water.

Respectfully subm
TH

Copies of this report were transmitted to the bo and to the local board of health.

OWEGO

ALB.

EUGENE H. PORTER, M.D., *State Commissioner o*

DEAR SIR: — I beg to submit the following rep investigation made by the engineering division water supply of the village of Owego.

Owego is an incorporated village in the south The village is located on both banks of the Susqu west of the city of Binghamton. It is on the m & W. R. R., and the Auburn Division of the Leh population is about 5,000.

The public water supply is derived from 2 sou as Barnes creek, and second, 2 large, but shallo the northwestern part of the village.

The water from the wells is pumped in an into the mains. The pressure in the system i concrete lined reservoir located on the steep si north of the eastern end of the village.

This reservoir has an area of .5 of an acr feet and a total capacity of 1,600,000 gallons.

The surface water supply is impounded at the village by means of an earth dam, and fl filter plant, to be described later, adjacent to and equalizing reservoir already mentioned. ing reservoir is discharged into an old reser basin, passes from there to the filter, and a the distributing reservoir.

The population served by the public water imately 90 per cent. of the total population daily consumption is estimated at 800,000 ga 000 gallons, and a minimum of 650,000 gall sumption, including a large consumption by day. There are about 1,000 service taps, 55 tered. The average pressure in the village can be raised to 130 lbs. for fire purposes by ing pressure direct from the impounding and operated by the Owego Water Works Co

An inspection of the public water supply of Owego was made on April 11, 1912, by Mr. A. O. True, assistant engineer of this Department. The engineer was assisted by W. L. Ayer, health officer of Owego, and was accompanied on an inspection of all parts of the work by Mr. Fred H. Stiles, representing the water company, and two members of village board of trustees.

The reservoir at Barnes creek is about 5 acres in area. It is uncovered and is said to have a capacity of about 60,000,000 gallons or approximately 2 months' supply. The watershed above the dam has an area of about 2 square miles and the population thereon is estimated at 15 to 20 people. The land is used for agricultural purposes but probably 20 per cent. is wooded.

Some opportunities exist for intermittent direct pollution in the regions just above the reservoir. About ¼ of a mile above the reservoir a highway crosses Barnes creek. At this point is a farm house with a barn and barnyard across the stream from the dwelling. The barnyard extends down to the water's edge and some 15 head of cattle at times have direct access to the water. The water company report that they have made arrangements to have this barnyard changed to the other side of the barn which will be at a distance of some 125 feet from the water. A watering trough will also be installed. A poultry house and the farm house privy are about 50 or 60 feet from the water, but the water company has installed a watertight concrete vault for the privy and a curbed cement floor for the poultry house.

There is also at this point some opportunity for pollution from road wash and also some animal pollution from the cattle at points along the stream where they have access to the water. About 100 feet east of this farm house is another farm house and buildings located on a moderate slope and about 450 feet from the reservoir. Although this slope is wet and springy and there might at certain times be some possibility for direct pollution of the water supply by animal organic matter, it would seem that such pollution would be slight and infrequent because of the distance of the sources of pollution from the reservoir. To the south and adjoining these buildings is a pasture extending down to the water's edge, giving some opportunity for pollution by animal matter.

At the filter plant and the clear water reservoir there appeared to be no opportunity for direct pollution. There is a farm house and barn on the highway several hundred feet above the plant. The drainage, however, is provided for by a long walled pit which would apparently prevent surface flow. The side hill drainage is also intercepted just above the coagulating reservoir and the clear water reservoir by a deep ditch supplemented by other cut-off channels and a blind drain above the coagulating basin.

The wells in the village are about 30 feet deep and 16 feet in diameter, walled up with rubble masonry plastered inside and out. The wells are about 30 feet apart and connected near the bottom by a pipe. The masonry extends 18 inches above the ground and both wells are covered with wooden removable covers. They are not otherwise protected from access. The upper 6 to 7 feet of the wells is said to be in loamy soil and below that is sandy gravel. The outside wall of the south well is said to have been puddled for a depth of 7 feet.

The pumping station is adjacent to the wells. The mechanical equipment consists in the main of two 100 horse-power boilers and two reciprocating pumps. One pump is a Worthington duplex tandem compound noncondensing steam pump 14 inches by 20 inches by 15 inches having a normal capacity of 2,000,000 gallons per day. The reserve pump is a 1,000,000-gallon per day Worthington duplex steam pump 16 inches by 10 inches by 4 inches by 10 inches. The suction lift is 14 feet to 23 feet and the dynamic head pumped against is about 95 lbs. per square inch.

The wells are located in an inhabited section, but the territory immediately surrounding them is owned by the company. The nearest permanent sources of possible pollution are distant about 100 feet. There is one privy vault and a stable manure pile about 100 feet southeast of the wells. The ground is flat, but has a slight general slope toward the Owego creek ¼ of a mile to the west. There are no sewers in this section of the village. The health officer stated that as far as he knew fecal organisms had never been found in

samples of the well water supply except in moderate num
These are accounted for by the waterworks superintende
chickens over the well covers.

The filtration plant for the purification of the creek
open coagulating basin and three gravity mechanical fi

The coagulating basin is an old reservoir in excavat
rior. It is 150 feet long by 90 feet wide and 10 feet
dinally by a baffle wall of matched planks. This gives
inlet to outlet of about 300 feet. The coagulant is ap
the impounding reservoir, in the filter plant pipe galle
the hill. The coagulant used is sulphate of alumina
from a single alum pot. The principle of applying an
feed is the familiar one of passing part of the inflo
quantity of lump sulphate, the flow being regulated b
tain quantity of alum is said to be introduced into th

The filter plant is housed in a wooden building wit
measuring about 40 feet by 30 feet. There are 3 gra
unit is equipped with an inlet float valve, a peripher
trough and an iron pipe manifold system with small
centers both ways. The filtering medium consists
and 3 feet 6 inches to 4 feet 0 inches of clean quart
size of about 0.71 m. m., and a uniformity coefficient
no outlet controllers and all valves are hand opera
is of wood and there are no valve stands.

In operating it is the intention to apply ½ to 1 gra
to the raw surface water according to the amount
The "coagulated" water has a period of subsiden
of operation of the filters of about 400,000 gallons

The total filter area is 588 square feet, which
normal rate of operation of about 30,000,000 gallo
maximum rate of about 37,500,000 gallons per acr

After passing through the filters the water is con
main to the adjacent clear water and equalizing re
charged in a thin sheet from a riser pipe near one

The washing of the filters is accomplished by
the coagulating basin to flow by gravity through
reverse direction from that of the filtered water.
sand by mechanical means or by compressed air.

The filter plant is operated by one attendant wh
once every day and sometimes several times a d
ters are said to be washed, usually once a day,

At the time of the inspection the water in the
considerable turbidity. Efficient coagulation d
place, however, and there was no easily visible e
ina was being precipitated in sufficient amount
to accomplish the best results to be obtained
tion. At this time all three filters were being
said to be about 300,000 gallons per day. Th
surface of the sand through some 40 small hole
troughs. There was no head of water over t
rectly into the sand, at or near the point wh
said that when the filters are running at the
water stands about 12 inches to 18 inches ov
are not equipped with loss of head gauges.

No samples for sanitary analysis were tak
analyses of samples of water from this publ

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d. disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Odor: Cold	Odor: Hot	Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as—: Free ammonia	Nitrogen as—: Albuminoid ammonia	Nitrogen as—: Nitrites	Nitrogen as—: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteria per c.c.	B. Coli Type (+=present, —=absent): 10 c.c.	1 c.c.	1-10 c.c.
B-270, C-236	Owego	Tioga	Tap filtered water	1/25/11	Trace	Clear	2 v.	2 v.	55	6	49	.010	.029	Tr.	0.16	0.20	1.00	19.5	1	3	—	—	—
B-269, C-271	Owego	Tioga	Tap, raw water	1/25/11																3,500	2+1—	1+2—	0+3—
B-237, C-319	Owego	Tioga	Tap, well supply	1/25/11	Trace	Clear	1 v.	1 v.	91	10	81	.008	.022	Tr.	0.60	0.10	4.00	71.4	71	50	—	—	—
B-272, C-271	Owego	Tioga	Tap, well supply	3/8/11	Trace	Clear	1 v.	1 v.	121	29	92	.006	.022	Tr.	0.40	0.10	4.75	85.7	81	22	—	—	—
B-318	Owego	Tioga	Tap, filtered water	3/8/11	Trace	Clear	2 v.	2 v.	44	10	34	.026	.046	.001	0.22	0.40	1.50	18.2	2	15	—	—	—
B-317, C-270	Owego	Tioga	Tap, raw water	3/8/11	5	5	2 v.	2 v.	44	11	33	.020	.118	.002	0.20	1.70	1.50	18.2	7	800	2+1—	1+2—	0+3—
B-389, C-319	Owego	Tioga	Tap, well supply	3/17/11	Trace	Trace	1 v.	1 v.	157	50	107	.006	.016	Tr.	0.54	0.10	5.75	87.1	81	5	—	—	—
B-390, C-320	Owego	Tioga	Tap, raw water	5/17/11	12	10	2 g.	2 v.	45	20	25	.028	.134	.001	0.12	2.00	1.75	16.9	9	110	1+2—	1+2—	0+3—
B-391, C-321	Owego	Tioga	Tap, filtered water	5/17/11	8	Trace	2 v.	2 v.	47	15	32	.004	.098	Tr.	0.12	1.50	1.75	16.9	9	55	—	—	—
B-5397, C-3321	Owego	Tioga	Tap, public supply	6/13/11	Trace	Clear	1 v.	1 v.	114	22	92	.006	.008	Tr.	0.40	0.50	3.25	88.6	81	.....	3+0—	1+2—	0+3—
B-5622, C-3499	Owego	Tioga	Tap, public supply	7/19/11	Trace	Clear	1 v.	1 v.	129	20	109	.002	.010	.001	0.30	0.30	6.25	91.4	84	50	—	—	—
B-5879, C-3678	Owego	Tioga	Tap, public supply	9/13/11	Trace	Clear	1 v.	1 v.	134	17	117	.004	.012	Tr.	0.40	0.30	5.75	98.8	97	19	—	—	—
B-6324, C-3960	Owego	Tioga	Tap, well supply	10/31/11	15	5	1 v.	1 v.	76	13	63	.006	.078	.003	0.26	2.40	3.25	45.7	33	190	3+0—	0+3—	0+3—
B-6225, C-3961	Owego	Tioga	Tap, filtered water	10/31/11	15	20	1 v.	1 v.	79	16	63	.036	.098	.001	0.30	3.20	1.75	27.3	14	450	3+0—	3+0—	1+2—
B-6223	Owego	Tioga	Tap, raw water	10/31/11																600	3+0—	2+1—	1+2—
B-6780, C-4436	Owego	Tioga	Tap, well supply	1/10/12	Trace	Clear	1 v.	1 v.	116	23	93	.022	.018	Tr.	0.72	0.00	3.25	88.6	82	40	3+0—	0+3—	0+3—
B-6779, C-4437	Owego	Tioga	Tap, filtered water	1/10/12	10	5	1 v.	1 v.	53	20	33	.036	.040	Tr.	0.60	0.50	1.62	19.7	5	180	1+2—	0+3—	0+3—
B-6778	Owego	Tioga	Tap, raw water	1/10/12																500	+	—	—
B-7054, C-4681	Owego	Tioga	Tap, public supply	2/8/12	5	Trace	1 v.	1 v.	63	20	43	.030	.052	Tr.	0.60	1.20	1.50	29.9	13	20	—	—	—

The analytical results of the unfiltered upland relatively soft water and carries but a moderate bidity. The two chemical samples of this water, has a high content of unoxidized nitrogenous org gestive of pollution by animal matters. Except in teria were high even for a surface supply. The B. were found in considerable numbers in all the sa except that of January 10, 1912. These chemical of analyses of the raw reservoir water indicate considerable animal organic pollution.

From the results the filtered water is, for the mo and color. The sample collected on May 17, 1911, amount of alkalinity as the samples of raw water This would indicate that at the time these sampl lant was being applied to the raw water. The e phate would be to increase the permanent hardnes On March 8, 1911, the analyses of raw and filter tion of the alkalinity by the decomposition of alu million. On October 31, 1911, and on January 10 an insufficiency of coagulant passing into the wa alkalinity of the filtered water was 14 and 5 parts

The bacteriological results of samples of the filte part satisfactory. The total count of the January ately high for a filtered water. The October 31, cessively high total count for a filtered water. B. also found in large numbers in this sample. The the time the efficiency of the filter was nothing. of the other samples, however, would indicate th were being obtained.

From the results of the five well water samples this water is generally free from color and turbi to moderate amount of nitrogenous organic matte tion as not to be indicative of direct pollution by matter. The chlorine content in this ground wate mal, and is probably accounted for from the fact shed of the wells is inhabited — chlorine being appreciably changed in amount in the passage of The well water is a hard water, though not excessi

Bacteriologically the well water supply was sat samples were taken. The total bacteria counts ar ate. In the majority of samples fecal bacteria w volumes tested. In the two samples where they in only volumes of the water as large as 10 c. c be taken as indicative of direct animal pollution.

From a consideration of the essential features ing the public water supply of Owego as affecti the supply I have come to the following conclusion

1. That the upland water supply as stored receives considerable pollution from organic from pasture land, the barnyard which is at of a mile above the reservoir, and possibly dental pollution from the dwelling house an same premises.

2. That the analyses of the impounded wat the filters are usually effecting fairly efficie of the supply.

3. That this efficiency is largely due to th usually obtained in the three mechanical filte

4. That a proper coagulation of the water times, due to the fact that no positive and s apply the sulphate of alumina to the raw wa

5. That should it become necessary to operate the filters at or near the rate at which it has been found necessary in practice to be economical for mechanical filters, that is, at rates of 100,000,000 to 125,000,000 gallons per acre per day, it would undoubtedly be desirable and probably necessary to more fully equip the plant with control devices and place it under the constant supervision of a skilled operator who would keep a complete record of its performances at all hours.

6. That the sand filtering medium used at the filter plant is too coarse for the best results in mechanical filtration.

7. That the present method of operating the filters with no head over the sand surface is productive of bad distribution and produces unequal rates in various parts of the sand layers.

8. That the well water supply, while the analyses which have been made of it from time to time do not show any direct or dangerous pollution, is subject to the effects of an inhabited watershed.

There exists, however, evidence of past pollution in the high chlorine content of the well water. Under ordinary circumstances the natural filtration of the water in its slow movement through the subsoil to the wells effects such a purification of the water that all other evidences of pollution are largely removed. This efficient natural purification process, however, may be suddenly interrupted and the hydraulic conditions so changed as to exceed the safe rate of movement of the ground water through the subsoil or to cause polluted water to flow to the well through more or less open gravel or even open under ground channels with little or no purification and thus pollute the water supply. Such changes or interruptions are frequently brought about by a rise in the ground water level at a distance from the well due to high water in neighboring streams or to a sudden lowering of the ground by an increased draft on the well.

In view of the above conclusions I beg to submit the following recommendations:

1. That all barnyards and poultry houses be removed to a distance of not less than 100 feet from any stream tributary to the impounding reservoir. That all privy vaults shall be removed from such tributaries to a distance of not less than 75 feet. That all privies which may be located between the distance of 200 feet and 75 feet of such tributaries be provided with watertight removable containers and that the Owego Water Company see that any such containers are not allowed to overflow and that their contents are safely disposed of by burying or other suitable means at such distance from the reservoir or tributaries thereto as to prevent any possible pollution of the public water supplies.

2. That the efficiency of the mechanical filters be increased and their effective operation be more satisfactorily provided for by (a) installation of approved devices for positively controlling the coagulant solutions and applying them to the raw water by gravity flow. (b) Providing for applying a part of the coagulant solution to the settled water just prior to its passage to the filters. This is desirable in order that some of the hydrate "flock" will pass on to the filters and not be lost by the long period of settling in the coagulating reservoir. (c) Throttling the outlets of the filters at such times as they are operated at very low rates, in order to maintain a head of water at all times over the sand surfaces. (d) Making and keeping records of the physical, chemical and bacteriological tests which are customarily made of the raw and filtered waters in the most carefully operated filter plants.

3. That should it become necessary in order to maintain a satisfactory degree of efficiency under increased rate of filtration due to increased consumption and greater percentage of filtered water, a finer sand be used for filtering medium. The effective size of the present filtering medium is approximately 0.71 mm. In practice the best results are obtained by sand having an effective size between .3 mm. and .5 mm. The present sand is very uniform, however, having a uniformity coefficient of approximately 1.6.

4. That in view of the location of the wells used ply and the possibility of their becoming polluted nearby resident population, that frequent analyses b company of the water from these wells, especially at and that should the records of these analyses indica pollution of the water, that the wells be abandoned water supply. Also that the wells be further safeg all manure piles and installation of watertight ren all privies within an eighth of a mile of the pumpin

5. That an area immediately surrounding the wells stray animals cannot approach or enter on the imm wells, and that the public be excluded from the are

6. That the wells be provided with conical or oth roofs to prevent pollution from the shoes of attendan

7. That a copy of this report be transmitted to th the Owego Water Works Co.

Respectfully submitted
THEODC

Copies of this report were inclosed in letters addressed Works Company and to the local board of health urgin to carry out the recommendations made in the report.

PAWLING

For report, see "Investigation of Outbreaks of Typh of this report.

PHILMONT

Certain matters in reference to the quality of the been brought to the attention of this Department in the local health officer and the chief engineer, an ins April 18, 1912. The following report contains the findi

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of Hea*

DEAR SIR: — I beg to submit the following report of by the engineering division in the matter of the publi village of Philmont.

Philmont is an incorporated village in the central pa about thirty miles southeast of the city of Albany. division of the New York Central and Hudson River population is about 1,900.

The public water supply for the village is derived small body of water located in a depression in the south of Philmont. The pond has a comparatively s being not over 275 acres in extent, and has no permaner able size tributary to it. The pond is about 2,000 fe 800 feet in width or approximately 60 acres in area. the water feeding the pond are evidently springs near the surface.

The surface of Forest pond is at an elevation of about sea level, as given by the topographical map of the Un Survey. The average elevation of the village is about sea level.

The water is taken from a small, narrow depression on the north shore of the pond near the western end. The intake is said to be a 6-inch pipe extending some 100 feet into the pond supported at the end on the bottom of the pond by a concrete pier at a point where the water is normally about 5 feet deep. The water flows by gravity into a circular masonry intake well with a cast-iron cover a few feet from the pond. In this well is located a vertical mesh screen resting in grooves above some stop-planks which limit the level to which the pond can be drawn by the village. From the intake well the water flows through a 6-inch cast-iron pipe by gravity to a small distributing reservoir located on the top of a hill about half a mile south of the village.

This is an open reservoir in excavation with stone masonry lining, and is about 80 feet in diameter and said to be 28 feet deep. It therefore would have a capacity of about 540,000 gallons. It is at an elevation of about 680 feet above mean sea level or about 320 feet above the average elevation of the village.

The distributing system consists of about 10 miles of cast-iron water mains ranging from 4 inches to 10 inches in diameter. This includes the 6-inch pipe line from Forest pond to the distributing reservoir, a distance of something over 4 miles. The water pressure in the village mains varies according to elevation from about 60 to 145 pounds per square inch.

The waterworks were built in the year 1896 by the village. They are owned and operated by the village at the present time and are under the charge of a board of water commissioners, of which Mr. Charles W. Ham is president.

Approximately 90 per cent. of the population of the village is served by the public water supply. There are 231 service taps, practically all of which are metered. There are no records or gaugings of the total average daily consumption of water from the public supply.

The investigation of the public water supply of the village of Philmont was made on April 18, 1912, by A. O. True, assistant engineer of this Department. The engineer was accompanied and assisted on the tour of inspection by Mr. James Hayes, president of the village, Mr. J. F. Gangloff, secretary of the board of water commissioners, and Dr. Z. F. Dunning, health officer of the village. All parts of the waterworks were visited and inspected.

A complete sanitary inspection was made of the immediate watershed of Forest pond. As has been already stated, the pond has a relatively small catchment area. More than half of the ground surface of the watershed is wooded. This wooded area is in the northwesterly part of the watershed. The southeasterly part of the watershed is partly cultivated ground and partly pasture land.

There are but two occupied buildings on the watershed of the pond and but one of these permanently. There are two houses in the extreme northwesterly end of the watershed, only one of which is occupied. They are distant from the pond about one-quarter of a mile. The only other occupied building on the watershed is a club house said to be owned by the Forest Lake Club of Hudson, which is occupied during the summer season. This club house is on the shore of the pond about 30 feet from the water's edge at a point just west of and some 300 feet distant from the village waterworks intake. The surroundings of this house were in a sanitary condition at the time of inspection. The privy used by those visiting the club house has an earth vault and is located on a flat slope about 300 feet from the pond. In front of the house is a boat landing and some boating and fishing is done on the lake during the summer season.

It is said that except for the members of this club few people visit the shores of the pond. The existence of occasional empty lunch boxes and cans near the shores would indicate, however, that the pond was visited occasionally by picnic parties.

Just west of the lake is a low and somewhat swampy area of about six acres in extent. It is overgrown with small wood and the wet weather stream issuing from it and entering the lake carries considerable color.

At the time of inspection wood was being cut on the hill
swampy area.

On the southeastern shore of the pond is a tract of c
gentle slope extending to within a few feet of the lake.
tained if fertilizer is put upon this land.

The watershed along the northeastern shore of the
narrow, and probably averages not over 400 feet in
shore and the divide. This area is used as a *pasture f*
cattle. At the time of inspection there were many accun
fecal matter near the shores of the pond and upon the
slopes above the water, giving ample opportunity for *ani*
to be washed into the pond during heavy rains.

The results of the analyses in parts per million of samp
from the distributing system of the public water supply by
Laboratory during the last thirteen months are given in t

REPORT OF WATER ANALYSIS FOR VILLAGE OF PH

Laboratory number	B-4737 C-2800	B-5134 C-3118	B-5439 C-3362	B-5908 C-3716	
Source	Tap public supply	Tap public supply	Tap	Tap	
Collected on	2/23/11	5/9/11	6/21/11	9/20/11	
Color	5	Trace	Trace	10	
Turbidity	Trace	Trace	Clear	Trace	
Odor, cold	1 v.	1 v.	1 v.	1 v.	
Odor, hot	1 v.	1 v.	1 v.	2 v.	
Solids, total	44	36	34	35	
Loss on ignition	21	16	10	11	
Mineral residue	23	20	24	24	
Ammonia, free	.022	.030	.022	.014	
Ammonia, albuminoid	.052	.110	.104	.060	
Nitrites	.001	.002	.003	.001	
Nitrates	0.04	Trace	Trace	0.10	
Oxygen consumed	0.40	1.10	2.90	3.10	
Chlorine	1.75	1.50	3.50	1.50	
Hardness, total	19.5	14.3	19.5	22.1	
Alkalinity	16	11	13	12	
Bacteria per c.c	400	150	200	90	
B. coli type	10 c.c.	10 c.c.	10 c.c.	10 c.c.	
	1+2—	—	2+1—	1+2—	2
	1 c.c.	1 c.c.	1 c.c.	1 c.c.	
	0+3—	—	0+3—	0+3—	1
	0.1 c.c.	0.1 c.c.	0.1 c.c.	0.1 c.c.	0.
	0+3—	—	0+3—	0+3—	0

* Sample taken shortly after break in pipe line.
Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, fai
decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fis
musty; v, vegetable.

REPORT OF WATER ANALYSIS FOR VILLAGE OF PHILMONT — (*Cont'd*)

Laboratory number	B-6856 C-4509	B-7224 C-4823
Source	Tap	Tap
Collected on	1/9/12	2/26/12
Color	6	5
Turbidity	5	Clear
Odor, cold	2 v.	1 v.
Odor, hot	2 v.	1 v.
Solids, total	40	47
Loss on ignition	11	17
Mineral residue	30	30
Ammonia, free	.034	.024
Ammonia, albuminoid	.190	.094
Nitrites	.003	Trace
Nitrates	0.04	0.04
Oxygen consumed	2.30	2.80
Chlorine	1.37	1.50
Hardness, total	18.2	14.3
Alkalinity	12	10
Bacteria per c.c.	20	20
B. coli type	10 c.c. 1+2— 1 c.c. 0+3— 0.1 c.c. 0+3—	10 c.c. — 1 c.c. — 0.1 c.c. —

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Forest pond furnished a soft water comparatively free from color and turbidity. Of the eight analyses, representing the character of the water during the different seasons of the year, none show a hardness as great as 25 parts per million and the average is about 17 parts. The chemical analyses also show a moderate content of carbonaceous organic matter but rather a high amount of nitrogenous organic matter in the form of free and albuminoid ammonia. However, these figures are not excessive, excluding the December 14, 1911, sample, which it is assumed is not representative of the supply and probably not indicative of any considerable amount of pollution by animal organic matter. The samples do not indicate any considerable activity in the bacterial oxidation of nitrogenous organic matter. The values for chlorine are probably somewhat but not greatly above the normal for this locality.

The bacteriological results of analyses are for the most part satisfactory. The total numbers of bacteria are moderate in all the representative samples with the possible exception of the sample of February 23, 1911. This shows a total count of 400 and is somewhat high even for a water partially surface impounded. Of the B. coli type examinations in two of the samples this organism or its type was not isolated in all the volumes analyzed. In five of the samples B. coli type was found in some of the 10 c. c. volumes only and in one of the many 1 c. c. volumes was the type isolated.

These results are consistent with the conditions found to exist on the surroundings of the sources of public water supply. They would indicate in the light of this inspection only a slight pollution of the pond water at the time the samples were taken. Such effects could have been readily produced by the washings into the pond of animal organic matter from the cultivated ground and the side hill pasture. There are opportunities for possible dangerous intermittent pollution from the occupancy of the pond and its immediate watershed, which of course might occur at such time or be of such character as not to appear in any occasional sample taken for analysis. Carelessness by those boating or fishing on the pond or in lumbering or any other operations on the watershed might be the cause of unknown pollution or even infection of the pond and the public water supply.

From a consideration of the main sanitary features of this investigation I submit the following conclusions:

1. That Forest pond constitutes a very favorable source of public water supply for the village of Philmont in respect to its physical features of location, elevation and the general character of the water from ground and surface sources.
2. That the sanitary quality of the water is injured by animal pollution from pasture land and possibly cultivated land on the margin of the pond.
3. That intermittent and more dangerous pollution of the public water supply is possible by those visiting the lake and the watershed adjacent to its shores for boating or picnic parties or to engage in lumbering or ice cutting.

In view of these conclusions I would make the following recommendations:

1. That the board of water commissioners of the village remove the permanent sources of pollution now existing at Forest pond by acquiring the cultivated and pasture lands adjacent to the pond, or acquiring control of the pasture land and requiring that no land shall be dressed with manurial or other undesirable fertilizer within such distance of the high water line as would allow a direct pollution of the water by surface drainage.
2. That boating or ice cutting be discontinued on the pond or allowed only under the strict direction of the board of water commissioners.
3. That the privy vault used by the club house be moved to a safe distance from any possible line of surface drainage to the pond and preferably over the nearby divide and out of the pond watershed.
4. That should the water commissioners experience any difficulty in protecting the public water supply from pollution they make application to this Department for the enactment of rules and regulations for the sanitary protection of this supply.
5. That regular and frequent inspections be made of the whole watershed of Forest pond and all other parts of the public waterworks to prevent any careless or wilful pollution of the pond or reservoir by those who visit these localities and endanger the public water supply.

In conclusion I would say that it would be most desirable that the village obtain greater and, if possible, complete control of the pond and the small tributary watershed thereto in order to thereby more directly maintain at all times the sanitary condition of the public water supply. The village should therefore adopt the policy of acquiring the necessary property to exercise this control, and action should be taken by the board of water commissioners to this end.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were included in letters transmitted to the board of water commissioners and to the local board of health urging that steps be taken to carry out the recommendations contained in the report.

PIERCEFIELD

The following report contains the findings of an inspection made as a result of complaints to this Department that the water supply of Piercefield was polluted by sewage.

ALBANY, N. Y., *March* 26, 1912.

EUGENE H. PORTER, M. D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation made by the engineering division in the matter of the public water supply of the village of Piercefield.

Piercefield is an unincorporated village located in the southwestern part of St. Lawrence county. It is on the left bank of the Raquette river, and 1¼ miles from the Piercefield station of the Adirondack Division of the New York Central & Hudson River Railroad about 90 miles northeast of the city of Utica.

There is located here a mill and water power owned and operated by the International Paper Co. The products are sulphite and ground wood pulp and paper.

The public water supply for the mill and the village is derived from the Raquette river at a point above the dam. The intake is a 10-inch pipe having a strainer with open end turned down and submerged at ordinary stages to a depth of about 14 feet.

Except at low stages of the river the water flows by gravity to a filter plant located in the lowest story and beneath the machine room of the paper mill. The filtered water is stored in a small clear water well from which it is pumped continuously by a system of direct pumpage into the distributing mains.

The filters are of the mechanical gravity type of recent construction having been installed in 1908. The filter plant consists of a coagulating basin, four rectangular filter units, a clear water well, chemical mixing tanks, and chemical feeding devices.

The water coming from the forebay by gravity is discharged into the coagulating basins. Just before the raw water reaches this basin it is treated with a small quantity of sulphate of alumina in solution.

The coagulating basin is of brick and concrete 30 feet long, 16 feet wide and 10 feet deep. This gives a period of subsidence of the water under the flow of the normal capacity of the filters of 1,150,000 gallons per day of about 45 minutes. Under the average actual consumption, said to be about 65 per cent. of the normal capacity of the filters or 750,000 gallons per day, the period of subsidence would be a little over an hour.

After the period of settling received in the coagulating basin, the water passes to the filters through an open concrete header, suitable hand operated valves making it possible to shut off this in-flowing water from each of the four filter units. The filter units are of concrete, rectangular in plan, each 14 feet 4 inches long by 7 feet wide. Each unit, therefore, has an area of 100 square feet and the aggregate filtering area of the plant is 400 square feet. The normal net rate of filtration for the plant is given by the builders as 1,150,000 gallons per day. This gives a normal rate of filtration per acre of about 140,000,000 gallons per day, allowing a short time which each unit would be out of service during the day for cleaning.

The filtering medium consists of 9 inches of gravel graded from ½ inch to ¾ inch, and 26 inches of sand, said to have an effective size of 0.4 mm.

Each filter unit is provided with a strainer system of galvanized wrought-iron pipes fitted with patented slotted strainers on 6-inch centers. The manifold pipe, into which is collected the filtered water from each unit, is connected to an automatic rate controller of the pressure type, whose function is to maintain a uniform rate of flow of water through the filter.

The filters are washed by means of the so-called system of "air wash." The inlet and outlet being closed, compressed air is admitted into the bottom of the filter through a manifold and distributing system to loosen the compacted sand, after which the filter outlet is connected with the pressure line of filtered water from the pump and clean water is allowed to flow upward through the sand. The sand is thus "floated" and the surface clogging impurities are washed away through overflow troughs connecting with the drains of the mill floor.

The filtered water is stored in a small brick clear water well with open top adjoining one of the filter units.

The filtered water is pumped from the clear water well to the distributing system by an 8-inch centrifugal pump which is run continuously.

The raw water is treated with sulphate of alumina just before it enters the coagulating basin. This solution is prepared on the floor above the filter plant in two wooden chemical solution tanks. From the tanks it flows to a

feed box from which a constant quantity of the coagulant of known strength can be fed by gravity into the raw water entering the coagulating basin. The control is by means of a low constant head on a small gate valve.

The filters are washed about every 8 hours, but during times of high turbidity in the river the time between washings is as low as 2 hours. The first filtrate after washing is not wasted as the practice is in the operation of some plants.

The distributing system consists of about 2 miles of water mains 4 and 6 inches in diameter. The average pressure maintained is about 40 lbs. per square inch. The waterworks are owned and operated by the International Paper Co.

Piercefield has a population of about 500 and not more than 65 per cent. are served with the public water supply. Wells and springs are used by those not served with the public supply and in the summer season rather universally, it is said, by all the inhabitants for drinking purposes.

An inspection of the water supply and filter plant at Piercefield was made on February 21, 1912, by Mr. A. O. True, assistant engineer of this Department. At this time an inquiry was also made into the pollution of the river above Piercefield.

The area of the watershed of the Raquette river above the intake of the water supply at Piercefield is estimated at 717 square miles. Although Piercefield is located at less than one-half the distance from the headwaters of the Raquette to its mouth, the area of the watershed above Piercefield is nearly 0.6 of the total area of watershed of the river. This is due to the fact that below Piercefield the watershed is comparatively narrow, while above it broadens out into a compact elliptical area. This area is in the Adirondack mountains and is intersected by innumerable streams, swamps and irregular ponds and lakes. Some of the latter are merely enlargements of the main drainage line of the Raquette, while others, principally the smaller bodies of water, are tributary to the river.

The total population upon this watershed above Piercefield is estimated at about 6,500, or on an average of 9 per square mile. In the summer season this is increased, by the temporary population, to about 8,000 people. Tupper Lake, the only incorporated village on this part of the watershed, has a population by the 1910 census of 3,067, that is, about one-half the normal population of this watershed is concentrated at this village.

The sewage pollution of the Raquette river which occurs above the water supply intake at Piercefield is principally from the village of Tupper Lake, with a comparatively small amount of pollution entering the lakes from the summer resorts and cottages along their shores. In 1908 a report was submitted by one of the assistant engineers of this Department giving the results of a sanitary survey of those dwellings and resorts from which sewage was discharged into the lakes (see report on Sanitary Inspections of Summer Resorts — Adirondack Mountains — 29th Annual Report State Department of Health, 1908, Vol. II, p. 792). From this report it is estimated that the sewage from some 400 people is discharged during the summer season into the lakes and streams of the watershed. This number would be considerably decreased because of the installation of sewage disposal plants by several of the resorts since they were investigated by this Department, but as no data is at hand as to a possible increase in the number of cottages, it would seem reasonable to place the present number at about 200 people contributing sewage during the summer season.

The assistant engineer visited Tupper Lake village on February 20, 1912, and made inquiries of the local authorities as to the amount of sewage which is discharged into Raquette river pond, a shallow enlargement of the Raquette river. No exact knowledge could be obtained as to the number of people tributary to the sewers. As near as could be learned there are about 500 people connected with the sewers in Tupper Lake and some 300 in Tupper Lake Junction, making a total of about 800 people in the village.

The sewage is discharged directly into Raquette lake through some 5 outlets at Tupper Lake and about an equal number of outlets at Tupper Lake Junction. The sewers have been privately built and it is said that they were

not designed or constructed by any comprehensive plan with a view to extension or forming a proper drainage system to serve the needs and growth of the districts in which they were laid.

The assistant engineer was informed that a public sewer system had been agitated by the village authorities at Tupper Lake, and that last fall the village board of trade had retained an engineer to inspect the locality and make a preliminary report upon the matter of sewerage and sewage disposal for the whole village.

The distance, measured along the channel, from Tupper Lake village to the dam at Piercefield is about 6 miles. The lower 1½ miles of this distance is through the "Piercefield Flow," a body of water caused by the dam and at average stages about ⅜ of a mile wide and 2½ miles long.

The results expressed in parts per million of the analysis of water collected from these works at the time of inspection, also samples collected at previous times by the State Hygienic Laboratory, are given in the following table.

REPORT OF WATER ANALYSIS FOR VILLAGE OF PIERCEFIELD

Laboratory number	....	....	....	B-7202	B-7201 C-4804
Source	Raquette river	Forebay	Tap on public supply	Tap raw water	Clear water well
Collected on	4/28/10	4/28/10	4/28/10	2/21/12	2/21/12
Color	....	....	....	....	5
Turbidity	....	....	....	....	Clear
Odor, cold	....	....	....	....	1 v.
Odor, hot	....	....	....	....	1 v.
Solids, total	....	....	....	....	47
Loss on ignition	....	....	....	....	16
Mineral residue	....	....	....	....	31
Ammonia, free	....	....	....	....	.044
Ammonia, albuminoid	....	....	....	....	.084
Nitrites	....	....	....	....	Trace
Nitrates	....	....	....	....	0.16
Oxygen consumed	....	....	....	....	4.40
Chlorine	....	....	....	....	0.75
Hardness, total	....	....	....	....	14.3
Alkalinity	....	....	....	....	5
Bacteria per c.c.	750	600	550	300	110
B. coli type	10 c.c. + 1 c.c. + 0.1 c.c. +	10 c.c. + 1 c.c. + 0.1 c.c. +	10 c.c. + 1 c.c. — 0.1 c.c. —	10 c.c. 2+0— 1 c.c. 3+0— 0.1 c.c. 1+2—	10 c.c. 1+2— 1 c.c. 0+3— 0.1 c.c. 0+3—

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m. musty; v, vegetable.

Unfortunately this series of results is not as valuable as it would have been were the corresponding results available for several or all of the 1910 samples. Also the bacteriological results for the 1912 analyses, at least those relating to total bacterial counts, cannot be interpreted as strictly representative of the water at the time of sampling as the samples were more than 24 hours in transit to the laboratory.

However, judging from the results at hand, it appears that this is a comparatively soft water, the raw water having a moderately high to high bacterial content. The raw water sample of February 21, 1912, had only the moderate bacterial content of 300 per c. c. The filtered water sample of the same date showed a total count of 110 bacteria per c. c., which might be said to be almost within the number of bacteria ordinarily thought to be allowable in a filtered water which before filtration showed less than 3,000 bacteria per c. c. In the sample taken from a tap on the distributing system April 28, 1910, and presumably filtered water, the total bacterial content of 550 per c. c. is excessive, in view of the comparatively low raw water counts of 750 and 600 and would indicate that the filters were not operating efficiently at that time.

The analyses for the B. coli type of bacteria indicate that the at almost all times, polluted by sewage. All the analyses of ra ples showed the presence of the B. coli type in as small volun All the filtered water samples showed a fairly satisfactory rem coli type, the latter organisms being found only in as large volu No data is at hand showing the efficiency of the filters in the rer suspended matters other than the bacteria. The filtered water turbidity and color at the time of sampling on February 21, water had been standing quiescent in the clear water well fo hours without use.

In discussing the sanitary quality of this public water suppl purpose to take up at length the construction and operation of purification of water supplies or the adequacy of the mechani of the works, but to discuss briefly and with particular referenc plant, the following main feature of construction and operatio the sanitary efficiency of mechanical filtration largely depends:

1. Subsidence of raw water.
2. Kind and amounts of coagulant.
3. Arrangement and control of devices used for applying
4. Rate of filtration.
5. Washing of filters.
6. Wasting first filtrate after washing.

1. Except for relatively clear waters a period of s quiescent storage is desirable, the length of such period o pending upon the amount and character of the turbidity. the water is retained in the coagulating basin where it obt of subsidence, based on the normal capacity of the plant of five minutes, and at the rate of filtration at which the to operate of something over one hour. This is a relatively of settling, and would protect the filters from undue c when the water was comparatively free from turbidity. It sible, however, to obtain equally efficient results with at le economy by frequent washings at such times. It must be however, that when the filters are out of service a greater le by reason of frequent washings, the net rate of filtration ma high for proper efficiency unless the total amount of v through is decreased.

2. A satisfactory and approved coagulant is used in the phate of alumina. During the winter period of minimum t amount of coagulant said to be used is about 0.4 of a grai In the spring more is said to be used, but no data is ava the exact quantity. In the best practice the quantities vary according to the character of the water from a minim ½ grain per gallon for relatively clear waters to a maxim 4 or 5 grains per gallon for relatively turbid waters.

3. While the devices for mixing and feeding the coagulant adequate and in accordance with common practice, their l surroundings are not conducive to careful operation and They are located in a dark corner of the machine floor and of inspection were almost inaccessible, being surrounded sulphite pulp. When the tanks were inspected the steam were so dense as to make close examination impossible. Suc may not always obtain, but it would be impossible at suc the attendants to operate the chemical food plant with accuracy.

4. As already stated, the normal rate of filtration is about gallons per acre per day. As the filters are at present opera of filtration would be about 90,000,000 gallons per acre pe latter rate is very moderate for a filter of this type. The

5. From the information obtained, it appears that the process of washing is not carried out with the care necessary with such filters nor in accordance with good practice. The air should be applied at a pressure of about 2 to 5 pounds per square inch before the wash water is applied. The latter should be applied at a pressure of about 12 to 15 pounds per square inch and at the rate of about 6 gallons per square foot per minute. The plant appears to be lacking in the necessary gauges and other appliances for controlling the air and wash water as to obtain the best results.

6. While not always considered necessary it is often found desirable in order to maintain the efficiency of the purification to waste that portion of the filtered water coming from a filter immediately after washing. This water is usually inferior, due to the fact that some time is necessary for the filtering medium to settle into working order and allow its surface to again become covered with a mat composed of the aluminum hydrate and the suspended matters entrained by it. This usually requires but a few minutes.

In addition to the several deficiencies in the operation and minor deficiencies in the equipment of the plant as pointed out in the foregoing, and which affect or may affect the efficiency of the water purification plant, I must point out another and more serious defect in the works whereby the purification process is at times completely interrupted.

As stated before, the flow to the filters from the intake is by gravity. The margin of available head for this flow is so small that at low stages of the river no water flows to the filter plant. At such times the filters are shut off and by means of another suction pipe water is pumped to the inhabitants directly from the river. This occurs principally, of course, in the dry weather and it is said that the filter plant is shut down at times for six or eight weeks. At the time of inspection, on February 21, 1912, the plant had not been running since some time the preceding day because of low water.

The possible evil from this defect is apparent. During the low stages of the river, in the months of dry weather flow, water is pumped directly to the consumers at a time when the effect of sewage pollution in the river is at its highest. At such times those in the mill are warned not to drink the water, and such warning is said to spread by "word of mouth" through the village, which accounts perhaps for the large use of wells and springs in the summer. At the time of inspection the local health officer was away, and no direct information was had as to warnings being issued by the local board of health.

I beg to summarize the foregoing with the following conclusions:

1. That while sufficient number of chemical analyses are not available to judge of the physical and aesthetic qualities of the water of the Raquette river at Piercefield during all seasons, it is evident from the bacteriological examinations that it shows at times evidences of dangerous pollution from the sewage discharged into the river above and principally at Tupper Lake.

2. That in essential features and as well as could be determined by a necessarily brief inspection, the design and construction of the filter plant is in accordance with ordinary and fairly good practice.

3. That the filter plant is indifferently operated and not subject to the care and precision necessary in the efficient operation of all mechanical filters.

4. That the interruption of the operation of the filter plant, especially for long periods during low water, is a menace to the health of the village.

I therefore make the following recommendations:

1. That the International Paper Company be required to increase the efficiency of the filter plant for the public water supply by (a) making and keeping records of the physical, chemical and bacteriological tests

which are customarily m
efficiently operated filter pl
sary gauges and similar a
efficient operation. (c) C
direct supervision of a sk
protecting the chemical m
preparation and control of
erence to proper light, spa

2. That the Internation
improve the arrangement
pumps in such a manner th
at all times.

Copies of this report were tr
and to the local board of healt

EUGENE H. PORTER, M.D., *Sta*

DEAR SIR: — I beg to submi
the matter of the public wate

Potsdam is an incorporated
St. Lawrence county on both
Rome, Watertown and Ogdens
Hudson River railroad about
The population of the village i
40 weeks of the year to abou
Normal School and the Clarks

The public water supply is
just above the power dam op
intake is cast-iron pipe 22 inch
river bed. It is said to be su
the river. From the intake th

The pumping station is loc
The station is a substantial st
municipal electric lighting sta
operate both the water supply

The pumping equipment cons
driven and one steam auxilia
Gould's triplex, one 10" x 12"
capacity of 1,500,000 and 1,000
auxiliary is a Buffalo double
700,000 gallons per day. The
no reservoirs being used. Th
pounds per square inch. Befo
the water passes through two
4 tanks in all. The first tank
this tank the water passes th
into a second tank which meas

These tanks are located bel
can be used alternately and b

The distributing system cons
ing from 4 to 10 inches in dia

The waterworks were built in the year 1871 and are owned and operated by the village. They are under the supervision of a board of water commissioners, of which Mr. R. J. Sanford is president. Mr. C. A. Littell is superintendent of the waterworks.

Practically all the people of the village are connected with the public water supply. There are 760 service taps, none of which are metered. The average daily consumption of water is estimated at 800,000 gallons.

An inspection of the Potsdam waterworks was made on February 20, 1912, by Mr. A. O. True, assistant engineer of this Department.

Samples of water for sanitary analyses were collected from the distributing system of this public supply. The results in parts per million of the analyses of these samples together with the results of the analysis of several samples taken by the State Hygienic Laboratory during 1910 and 1911 are given in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0. none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy f, fishy; g, grassy; m, musty; v, vegetable

Laboratory number	Municipality	County	Source	Date of collection	PHYSICAL				CHEMICAL (PARTS PER MILLION)											BACTERIOLOGICAL			
							ODOR		SOLIDS			NITROGEN AS—						HARDNESS			B. COLI TYPE +=PRESENT —=ABSENT		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.

These results indicate that this is a comparatively soft water. It appears to be high in color at all seasons. The results for turbidity are moderate but somewhat variable. The amounts of nitrogenous organic matter are high in most of the analyses. The nitrogenous matter appears in the form of moderate to high free and albuminoid ammonia and low nitrates with traces of nitrates. Such a distribution indicates the presence in the river water of considerable quantities of organic matter from not distant sources of pollution.

About one-half of the samples examined show an excessive total bacterial count. The remainder are moderate to high in total bacteria. The results of the tests for the B. coli type of organisms are unsatisfactory. This type of fecal organisms appears in some or all of the 10 c. c. volumes, in nearly one-half of all the 1 c. c. volumes tested, and in one of the 1/10 c. c. volumes. While positive results for the B. coli type can usually be obtained from large samples of surface waters which are relatively free from animal pollution, their frequent isolation from as small samples as 1 c. c. or 1/10 c. c. is considered evidence of sewage or similar animal organic pollution.

These analytical results are consistent with what would be expected from a knowledge of the conditions on the Raquette river watershed above the intake of this public water supply — to be outlined below. The results may be briefly summarized as indicating a water which physically is high in color and at times quite turbid; chemically a relatively soft water, but containing a relatively large amount of organic matter of which the nitrogenous organic matter is in quantity and state of oxidation indicative of recent pollution; and bacteriologically, unsatisfactory and corroborating, by the high bacterial count and the excessive numbers of types of fecal bacteria, the evidence of pollution found in the chemical results.

It is the policy of this Department, in its efforts to fulfill the requirements placed upon it by the Public Health Law, to examine into the sanitary condition of the public water supplies serving the people of the State and to advise relative to the needs for their improvement. It is not possible for this Department, however, with the present limited means at its disposal, to make the extended studies of the economic and engineering features which are necessary as a basis for final recommendations. It will be my purpose, therefore, with this, as with previous similar investigations, to confine my conclusions and recommendations relative to the public water supply conditions at Potsdam largely to those features of the present supply pertaining to the public health and convenience of the inhabitants of the village.

The following statistics pertaining to the hydrology and the location, sources and amounts of pollution of the Raquette river are taken largely from the report of Mr. H. W. Taylor, assistant engineer of this Department upon the sanitary survey of the Raquette river watershed (see 29th Annual Report State Department of Health for the year 1908, Vol. II, p. 604).

Total area Raquette river watershed about 1,240 square miles. Estimated total area Raquette river watershed above Potsdam, 1,910 square miles.

Estimated total population on watershed above and not including Potsdam, 10,660.

Estimated average population per square mile of watershed above and not including Potsdam, 10.4.

Probable minimum mean weekly flow of Raquette river at Potsdam, 850 cu. ft. per second.

Population discharging raw sewage into Raquette river above Potsdam about 1,210.

Approximate quantities of industrial wastes discharged into Raquette river above Potsdam:

Lime	2,600 lbs. per day.
Sulphur	3,750 lbs. per day.
Wood fibre	61,000 lbs. per day.

Also some sawdust and wash water from butter factory.

The amount of this pollution which is discharged into the somewhat elaborate system of lakes at the headwaters of the river in the Adirondacks is very small. This pollution is from the summer resort population along the lakes

and is estimated at not more than 200.
lower reaches of the river is greatly les
storage.

The natural processes of purification,
those communities down stream which
ment, for household and drinking purp
considerable intermittent pollution by h
likely possibility of the more resistant d
for long distances and causing a dangerou
supplies taken from the stream.

At Tupper Lake, about 45 miles above
people is discharged into Raquette pond
Piercefield, about 5 miles below, the sew
river. Between Piercefield and Potsdam
Raquette.

The number of people sewering into thi
than 100. This pollution takes place p
Falls where mills are situated.

That this pollution, principally from T
constant and significant effect upon the qu
Potsdam is evidenced in the unsatisfacto
sults discussed above. It is possible that
supply of Potsdam occurs within the vill
ings and occupied areas adjacent to the riv
from other inhabited areas about half a mi
which are not supplied with sewers and fr
animal and human organic matter directly
of the village of Potsdam outfall into the r

It is stated by the local authorities that
and springs by the people of the village,
poses. The use of wells and springs in a
always of questionable advisability and is
health from possible infection of the water
have arisen from the use of wells and spring
to be of questionable quality and the danger
able circumstances and without the knowled
authorities, the water would become infecte

From a consideration of this necessarily b
of the analyses that have been made by the
of the opinion that the public water supply
present taken from the Raquette river and
subject to dangerous pollution by the sewage
municipalities above, and perhaps to some slig
surface wash of inhabited areas. The physic
supply are also injured by the discharge of
trial wastes, sawdust and bark into the rive

As I have pointed out in the case of other
fied water from the Raquette and other pollut
State, the public water supply of Potsdam co
quality and safety with the average public
reasonably good public water supply should, i
residing in the municipality with an abundan
pure water for all household purposes.

Regarding remedial measures for the impro
ply of the village the limited scope of these
of general recommendations with regard to t
alternatives of improving the present supply b
fication, or the abandonment of the present su
new source of supply are questions of sanit
which, as has already been pointed out, canno
this Department, and the village should hav
sanitary engineer, who would inquire into and
these primarily important questions.

I have been informed that other sources of public water supply have been considered, but that no conclusions had been reached as to their advisability.

With regard to the present supply, it cannot be overlooked that the Raquette river affords a nearby and unfailing source of water supply. Whereas the conditions along this stream as regards the pollution of the water by household sewage may be improved in the future by the recent and more stringent requirements of the Public Health Law, it cannot be expected that a stream of this size and character, even though direct pollution is largely removed by the installation of reasonably efficient sewage disposal plants, will furnish at all times an acceptable and safe water for human consumption, unless recourse is had to artificial means of purification.

In the case of large streams, the primary object of the purification of the sewage resulting from the household and industrial economy of a considerable population on the watershed is usually the elimination of nuisances and the conservation of the desirable physical and aesthetic qualities of the water. Works for the accomplishment of such an object can be installed and operated with efficiency. While such works also undoubtedly lessen the danger of infection of any water supply taken from the stream, they cannot be expected nor are they usually designed, to safeguard water supplies at all times from such disease causing bacteria which may enter the stream from municipal drainage systems.

The solution of the problem of sewage purification and safe and adequate water supply for any district are matters of engineering economy which can be solved only by a study of the conditions and requirements of each locality. In our present knowledge of the art of sewerage and public water supply purification, however, it is usually found that under conditions like those in question the best economy is secured from the standpoint of public health by such purification of all sewage entering the stream as to prevent nuisances together with a relatively high degree of purification of all water supplies taken from the stream. In this way not only is economy secured but the water supply is protected from chance and uncontrollable pollution which arises from other pollution sources than sewage discharge.

In the case of the public water supply of Potsdam as at present taken from the Raquette river, and because of possible undesirable conditions of taste, odor and color in the water caused by the discharge of considerable quantities of saw dust, bark, sulphite liquors and small quantities of other wastes, it would seem that some approved process of filtration, if properly installed and carefully operated, would not only guard against disease producing bacteria but would largely remove the undesirable characteristics referred to above.

In summarization I submit the following conclusions from this investigation:

1. That the public water supply from the Raquette river at Potsdam is polluted with sewage and trades wastes, and unless it is treated by some approved process of purification, cannot be considered a safe and acceptable supply.

2. That although the gross pollution of the Raquette river by household sewage must be corrected in the near future in view of the demands of the people of the State as expressed in the Public Health Law, and in accordance with the policy of this Department to conserve the purity of the State waters, it is unlikely that water supplies from this stream, because of the effect of trades wastes or relatively small amounts of uncontrollable intermittent pollution, can be rendered safe and acceptable at all times except through some method of purification.

3. That the use of wells and springs as sources of water supply for household purposes is attended with considerable risk to health in a community as thickly populated as Potsdam.

In view of these conclusions I beg to make the following recommendations:

1. That the board of water commissioners of the village of Potsdam take steps to improve the sanitary quality of the public water supply by the installation of some approved method of purifying the present Raquette river supply or by seeking and installing a new safe and adequate source of water supply.

2. That a copy of this report be transmitted to the b board of water commissioners of the village of Potsdan

In order that the important engineering and sanitary fe sidered in developing a new supply, or improving the pre and also that careful and accurate comparison can be m possible plans to determine the best and most economical the village with a safe and acceptable water, the villag services of a competent sanitary engineer to thoroughly vise them in this matter.

Respectfully submitted,
THEODOI

Copies of this report were transmitted to the board of and to the other village authorities.

RAVENA AND COEYMANS

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of Heal*

DEAR SIR: — I beg to submit the following report u gation of the public water supply furnished by the Ha pany to the villages of Ravena and Coeymans.

Ravena and Coeymans are adjacent and unincorp in the extreme southeastern part of Albany county in They are 13 miles south of the city of Albany. Raver railroad and Coeymans lies about three-fourths of a bank of the Hudson river. The combined population is about 2,400.

The public water supply for these villages is d Hannacroix creek, a stream having a considerable 14 miles northwest of the villages and flowing into a mile below Coeymans.

The upper or impounding reservoir, known as Ha on a tributary of Hannacroix creek about 8 miles an artificial body of water formed by excavation stream about a mile south of Hannacroix creek. I 70,000,000 gallons.

The lower or distributing reservoir is located point about 2 miles southwest of Ravena. It is concrete masonry dam 5 feet high and 125 feet through which the stream flows. It is roughly gallons. From this reservoir the water supply to the village and to a small supplementary pu or high service reservoir.

The high service reservoir for fire protection a few houses situated on relatively high elevati mile southwest of Ravena on a ridge above the voir in earth excavation, having a capacity of a reservoir is filled by water from the intake re of the small nearby pumping station mentioned engine.

The distributing system consists of about 9.1 ranging in size from 1 inch to 12 inches in in the district varies from 20 to 110 pounds p

These water works were built in 1897 fro direction of Mr. J. W. Lamb. They are at p the Hannacroix Water Co. of Ravena. Mr. J of this company.

About 75 per cent. of the inhabitants of the district are served by the public water supply. The total daily consumption of water is estimated at about 1,000,000 gallons. About 30 per cent. of this is used for household purposes and 70 per cent. for commercial purposes. Only five of the services are metered.

The investigation of this water supply was made on July 5, 1912, by Mr. A. O. True, assistant engineer of this Department. The engineer was accompanied on this inspection by Dr. M. S. Reid, health officer of the town of Coeymans. No attempt was made to cover all inhabited portions of the watershed. The main stream was carefully inspected for a distance of about seven miles above the intake. While all parts of the watershed of Hannacroix creek above the water works intake should ultimately be inspected for any possible sources of pollution of the Ravena water supply, that portion of the creek from Alcove to the intake, that is along the seven miles mentioned above, is probably of the most importance from a sanitary standpoint, as it embraces the larger settlements and is directly above the water works.

A report made by a committee of the board of health of the town of Coeymans, Messrs. Broughton and Gallup, on an inspection of the sanitary conditions of Hannacroix creek, above the intake reservoir, was of great assistance in the present inspection.

Hannacroix creek, the stream from which this water supply is obtained, rises in the town of Berne, in the western part of the Helderberg range. The area of the watershed of this stream above the intake reservoir is about 60 square miles. The total population of this watershed is estimated at 2,000. Approximately one-third of this population is found in the hamlets along or near the banks of the creek from one and one-half to seven miles above the water works intake.

No direct sources of pollution of the water supply were found in the vicinity of the intake reservoir. There is one house on the southern side of the reservoir, distant about 150 feet from the water's edge. Although this dwelling is on high ground the topography along the margin of the reservoir is such as to prevent any surface flow from the house into the water supply. The privy vault for this house is in the rear of the premises and distant from the reservoir about 200 feet.

A long span highway bridge crosses the upper end of the reservoir or mill pond. About 600 feet above the mill pond on the right bank of the stream, there is a dwelling having a privy with earth vault 45 feet from high water mark. About one-quarter of a mile above the mill pond, also on the right bank is a dwelling, having a surface privy 15 feet from the top of a precipitous slope to the stream. A drainage ditch leads from the rear of the privy to the top of the bank. On the left bank nearly a mile above the mill pond there is a house on the northern side of the highway. The privy of these premises has a loose stone vault, located about 50 feet from a small tributary of Hannacroix creek.

At the hamlet of Aquetuck, one and one-quarter miles above the mill pond, there exist several opportunities for pollution of the creek. A short distance west of the intersection of the highways there is a privy with a surface vault 25 feet from the creek.

At the next premises east there is a privy vault and hen house on a ditch draining into the creek. Directly across the street there is a sink drain from the premises, discharging into a vitrified pipe drain carrying surface water to the creek. On the bank of the creek in the rear of the hotel there was, at the time of inspection, an insanitary dump. On the highway one-quarter mile west of the road intersection in Aquetuck is a dwelling on which is maintained a surface privy 20 feet from a steep bank of the creek; also a privy directly over the bank said to be unused. Also drainage from wash house is discharged over the steep bank of the creek. About a mile and a half west of Aquetuck on the highway north of Hannacroix creek is a barn yard near a tributary to the creek. On the highway on the south side of the creek and three-quarters of a mile east of Coeymans Hollow there is a

dwelling on which is maintained a privy vault 10 precipitous bank of the creek. Just west of this pc 175 feet from a tributary of the creek.

In Coeymans Hollow there are several opportuni water supply. On the highway south of the creek rectly on the stream through which the overflow f and drains into the creek. Also a manure pile o creek. On the same road a quarter of a mile wes there is a slaughter house 50 feet from the creel spection the hog killing platform was at the wat 40 feet from the creek. In the western part of creek, there is a barn yard 20 feet from the creek.

One mile west of Coeymans Hollow near the b of the creek, there is a surface privy 15 feet fror On the premises of the next house west there is n feet from the tributary. On the same road ne there is a surface privy on the highwater mark mile further west there is a privy vault on a pr

The following opportunities for pollution are l miles above the mill pond and water works inta

Alcove creamery drains washings through a distance of about 450 feet to creek

Surface privy 8 feet from high water ma creek

Privy on top of a cliff discharging directl

Barn yard near and draining directly int

Surface privies along highway east of Ha

One 12 feet from high water mark

One 40 feet from high water mark

One 20 feet from high water mark

One at water's edge

The results of analyses of samples of the pub of Ravena and Coeymans, covering a period o in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; c, earthy; f, fishy; g, grassy; m, musty; v, vegetable

Laboratory number	Municipality	County	Source	Date of collection	Physical				Chemical (Parts Per Million)												Bacteriological			
							Odor		Solids			Nitrogen as —						Hardness			B. Coli Type + = present — = absent			
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Minera residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c. c.	10 c. c.	1 c. c.	1-10 c.c.
....	Ravena	Albany	Tap, public supply	7/10/08	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	275	+	+	......
....	Ravena	Albany	Tap, public supply	7/10/08	2	5	....	....	160	....	....	.004	.080	.005	0.10	1.40	2.30	117.2	115.5	275	......	+	+
....	Coeymans	Albany	Reservoir, public supply	6/20/09	23	2	....	....	69	....	44	.008	.164	.001	Tr.	5.30	0.25	35.1	27.0	......	......	......	......
....	Ravena	Albany	Tap, public supply	2/10/09	8	7	....	....	97	....	73	.016	.102	Tr.	0.20	2.80	1.87	51.4	40.0	3,100	+	+	+
....	Ravena	Albany	Tap, public supply	2/ 8/10	5	3	....	....	102	....	77	.006	.032	.003	0.40	2.20	2.50	58.6	48.0	550	+	—	—
....	Ravena	Albany	Tap, public supply	10/17/10	1	5	....	....	158	....	117	.004	.118	.002	Tr.	1.30	2.25	117.2	117.0	130	+	—	—
B-4394 C-2498	Ravena	Albany	Tap, public supply	12/21/10	5	Trace	....	....	162	....	127	.016	.022	.002	0.20	0.70	2.25	120.0	112.0	200	2+1—	0+3—	0+3—
B-4664 C-2731	Ravena	Albany	Tap, public supply	2/ 8/11	Trace	Trace	1 v.	1 v.	121	35	86	.018	.082	.005	0.30	3.50	4.25	74.3	68.5	220	3+0—	1+2—	0+3—
B-4929 C-2924	Ravena	Albany	Top, public supply	3/27/11	20	5	2 v.	1 v.	106	38	68	.032	.054	.002	0.30	3.20	2.50	54.3	44.0	1,200	3+0—	0+3—	0+3—
B-5176 C-3144	Ravena	Albany	Tap, public supply	5/15/11	20	5	1 v.	1 v.	136	37	99	.008	.100	.002	0.04	1.80	2.75	85.7	83.0	400	3+0—	1+2—	0+3—
B-5506 C-3405	Ravena	Albany	Tap, public supply	6/30/11	10	Trace	1 v.	1 v.	133	12	121	.006	.022	.001	0.20	1.37	2.50	100.0	69.0	1,200	2+1—	0+3—	0+3—
B-5796 C-3610	Ravena	Albany	Tap, public supply	9/ 6/11	10	5	1 v.	1 v.	136	7	129	.004	.102	.002	Tr.	0.70	3.25	120.0	98.0	850	2+1—	0+3—	0+3—
B-6085 C-3842	Ravena	Albany	Tap, public supply	10/17/11	8	Clear	1 v.	1 v.	149	31	118	.014	.066	.001	0.04	1.10	2.62	100.0	95.0	140	1+2—	1+2—	0+3—
B-6576 C-4260	Ravena	Albany	Tap, public supply	12/11/11	5	Clear	1 v.	1 v.	115	12	103	.012	.062	.002	0.30	1.30	2.62	81.4	68.0	400	3+0—	0+3—	0+3—
B-6884 C-4525	Ravena	Albany	Tap, public supply	1/22/12	5	Trace	1 v.	1 v.	139	24	115	.016	.040	.002	0.52	0.50	2.50	91.4	86.0	325	2+1—	0+3—	0+3—
B-7222 C-4824	Ravena	Albany	Tap, public supply	2/26/12	12	25	2 v.	1 v.	108	23	85	.012	.128	.003	0.40	5.50	2.25	40.3	33.0	42,500	3+0—	3+0—	1+2—
B-7632 C-5192	Ravena	Albany	Tap, public supply	4/ 5/12	10	20	1 v.	1 v.	85	15	70	.008	.074	.001	0.36	2.30	1.50	47.1	36.0	600	3+0—	2+1—	0+3—

The water of Hannacroix creek is hard, though the that the degree of hardness is somewhat variable. Son samples would be classed as only moderately hard. Th ably influenced by rains and wet weather flow. As wo such circumstances the figures showing a large amount the most part in the samples collected during the dry color, though variable, is on the average moderate. 1 from the system has shown but a small amount of tu

The average amounts of nitrogen found in various are not excessive for a surface impounded water. T as free ammonia are moderate for a surface water. albuminoid ammonia are excessive. The nitrites are mal, and the mineral nitrogen content (nitrates) The values for oxygen consumed are moderate to chlorine are from one to two parts per million high waters for this part of the State.

The total numbers of bacteria in the different sa 37½ per cent. of them are moderate for a surface per cent. are high, and about 25 per cent. excessiv used for potable purposes.

The results of the examination of the samples for organisms are somewhat unsatisfactory. While the isms in comparatively large volumes of surface im 10 c. c. or more, is not considered as important evi mal organic matter, their repeated occurrence in co of the water is strong evidence of pollution by org gin. Of the 16 different samples examined for showed this type of organisms in one or more of t and in one sample they were isolated from one of

These chemical and bacteriological results wou this supply is generally of good appearance, and turbidity, but at times rather high in color. Ch carries a considerably higher than normal chlori than an average amount of nitrogenous organi the supply shows total numbers of bacteria usu of what is expected of a potable surface water and fecal organisms frequently in such number cate pollution by animal organic matters.

These analyses are consistent with the cond Hannacroix creek above the water works intak it a considerable population and many domest this population is resident along these reaches the intake reservoir. As has been pointed ou direct as well as intermittent pollution on the tributaries in this part of the watershed. M which a most dangerous character of pollutio supply and therefore constituting an opportu The pollution from other sources of organic mal enclosures while it is a medium which tunities for infection of the water supply nevertheless it may under some circumstanc it injures the aesthetic quality of the wate types of algae growths which impart disag water.

In summarization I submit the follow public water supply:

1. That Hannacroix creek with the quate source of public water supply Coeymans for present and future need
2. That the physical and aesthetic be moderately good though somewhat

3. That the sanitary quality of the water is injured by a considerable and more or less direct pollution of the streams by animal organic matters from habitations and animals located in proximity to the streams above the intake reservoir.

4. That the drainage from the privy vaults directly on the streams or from those which are leaky or improperly constructed is a constant danger to the health of those using this supply for potable purposes because of the possibility of infection of the supply.

In view of these conclusions I beg to submit the following recommendations:

1. That the Hannacroix Water Company take immediate steps to remove the more dangerous sources of pollution enumerated in this report together with any other sources which may be found upon further investigation.

2. That the Hannacroix Water Company promptly cause a thorough inspection to be made of all parts of the watershed of Hannacroix creek above the water works intake, with a view of abating any sources of pollution of the water supply which may be found.

3. That should the Hannacroix Water Company experience any difficulty in removing the sources of pollution referred to above they apply to the State Department of Health for the enactment of rules and regulations for the sanitary protection of the watershed.

4. That in case the above means of removal of pollution prove inadequate or fail to furnish the protection necessary for a pure and safe water supply, the Hannacroix Water Company study the development of some other source of supply of undoubted purity or resort to some satisfactory means of water purification.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the Hannacroix Water Co. and to the local Board of Health.

RHINEBECK

For report see "Investigation of Outbreaks of Typhoid Fever," page 798 of this report.

RICHMONDVILLE

ALBANY, N. Y., *August* 9, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon the recent investigation of the public water supply of the village of Richmondville.

Richmondville is an incorporated village in the western part of Schoharie county. It is on the Delaware & Hudson Railroad 50 miles west of the city of Albany. The village is on the right bank of Cobleskill creek near its headwaters, and near the divide between the Susquehanna and Hudson river watersheds. The present population is about 600.

The public water supply is derived from springs and the run-off from a small watershed adjacent to and supplying them. The water is stored in an open impounding and distributing reservoir at the lower edge of the watershed. From this reservoir the water flows by gravity to the village a little more than three miles to the southeast.

An inspection of the watershed of this public water su April 27, 1909, by Mr. H. B. Cleveland, Principal Assista Department, in connection with an investigation into an o fever in this village. (See 30th Annual Report State Dep Vol. II, page 490.)

The water works distributing system consists of abou mains mostly of cast iron pipe, and a small percentag pipe. The mains range in size from 2 to 10 in There are about 125 service taps on the system no metered. The average water pressure in the village is ab square inch. About 95 per cent. of the population of the by the public water supply. The water works were insta They are under the direction of a Board of Water Comn B. Mann is president of the Board.

The investigation of the public water supply of the vil ville was made on August 7, 1912, by A. O. True, Assista Department. The engineer was accompanied and assis Shafer, Health Officer of the village, Dr. I. G. Harringto village Board of Health, and Mr. J. W. Davis — membe Health. Information concerning the water works was k Mr. S. G. Shafer, member of the Board of Water Commi

The impounding and storage reservoir is located one south of the D. & H. R. R. at a point about 3¼ miles village. It is an open reservoir with irregular contour acres. It is built partly in excavation and partly in fill. are riprapped. There is a spillway some 25 feet wide at th let end. At this end the reservoir is some 7 or 8 feet deep western or inlet end. The capacity is estimated at about The land surrounding the reservoir is enclosed by a wire f this land on the west and south are pasture lands. On rises steeply to the highway and railroad. Along this pr within 40 or 50 feet of the reservoir there is a lane for cat the time of inspection, accumulations of manure along this site the reservoir. Some 10 head of cattle have access to tributary to the reservoir and there were accumulations bed of one of these streams at a point about 200 feet a There were also evidences that cattle and horses had walk stream at this point.

The land around the reservoir is fenced off forming an 3 acres in extent. This fence is of wire, but is not built i to exclude the cattle from the neighboring pastures. manure were found within this enclosure even to the water voir and it was evident that cows had had ready access to

The watershed above the reservoir lies largely on three hills, whose steep sides are uninhabited. There are, howeve on the watershed and a total resident population of abo area of the watershed tributary to the supply is about 1¾ main highway and the D. & H. R. R. pass through the w to west. Another highway, less used, leaves the above southerly through the watershed.

About ⅝ of a mile west of the reservoir there is a farm h tributary to the water supply. The privy at these premis the edge of a steep bank or terrace just above the stream phoid fever at Richmondville — Annual Report State Dep 1909, Vol. II, page 490) but was subsequently moved to i about 40 to 45 feet from the stream on moderately slopin

About ¾ of a mile west of the reservoir there is a dwe 300 feet northwest of the highway and near the railroad tr on these premises is on a moderately steep slope bordering to the public water supply and about 40 feet from the w was a large accumulation of manure in this barnyard at the

Just northwest of this point and between the headwaters of the stream and the railroad the slope is precipitous. A considerable area on these slopes is cultivated and undoubtedly spread with manurial or other fertilizers.

The D. & H. R. R. tracks pass through the watershed for about 1½ miles. The tracks are along a contour of the steep hills in the northern part of the watershed. No opportunities were found along the railroad right-of-way for direct pollution of the springs or streams of the public water supply.

The results of analyses of samples of the public water supply of the village of Richmondville made at the State Hygienic Laboratory are given in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as —: Free ammonia	Nitrogen as —: Albuminoid ammonia	Nitrogen as —: Nitrites	Nitrogen as —: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+ = present, — = absent): 10 c.c.	1 c.c.	1-10 c.c.
....	Richmondville...	Schoharie....	Tap on public supply..	3/19/09	1	8	....	....	55	....	39	.018	.120	.001	0.12	1.35	0.87	24.7	17	1,450	+	—	—
....	Richmondville...	Schoharie....	Tap on public supply..	10/21/09	Trace	5	....	....	112	....	82	.004	.030	.003	0.04	0.95	2.50	75.7	71	210	+	+	+
....	Richmondville...	Schoharie....	Tap on public supply..	4/26/10	3	Trace	....	....	64	....	44	.002	.048	.003	0.10	1.40	0.87	28.6	28	650	+	—	—
....	Richmondville...	Schoharie....	Tap on public supply..	11/ 4/10	12	2	....	....	95	....	85	.006	.046	.002	0.02	1.80	2.50	67.1	66	700	+	+	—
....	Richmondville...	Schoharie....	Tap on public supply..	1/19/11	10	5	1 v.	1 v.	50	12	38	.006	.048	.001	0.24	2.40	1.50	26.0	22	475	3+0—	0+3—	0+3—
B-4561 / C-2651	Richmondville...	Schoharie....	Tap on public supply..	4/ 3/11	15	15	2 v.	2 v.	72	21	51	.026	.078	.001	0.40	2.20	1.50	23.4	16	900	3+0—	1+2—	1+2—
B 4956	Richmondville...	Schoharie....	Tap on public supply..	5/ 4/11	10	15	1 v.	2 v.	107	32	75	.022	.088	.002	0.20	1.10	1.00	40.3	23	1,300	3+0—	3+0—	2+1—
			Tap on public supply..	...11	10	Trace	1 v.	1 v.	60	11	49	.004	.028	.003	0.10	1.80	1.50	48.6	49	1,500	2+1—	0+3—	0+3—
											75	.008	.062	.002	Tr.	1.20	2.75	71.4	65	900	2+1—	0+3—	0+3—
																		[illegible]	47	600	3+0—	2+1—	1+2—

The examination of these samples would indicate that physically the water from this supply has a low to moderate amount of color and at times has considerable turbidity. No excessive odors were found in any of the samples or any odors indicative of large numbers of those algae which impart disagreeable tastes and odors to a potable water. The amounts of organic matter though somewhat variable are not excessive for a supply receiving some surface impounded water. The figures for free ammonia are low to moderate and for albuminoid ammonia are moderate. The values for chlorine are higher than normal. The chlorine value for normal waters in this region is less than 0.5 of a part per million. The average chlorine for these samples is about 1.6 parts per million. This supply is a moderately hard water, the underlying strata of the region being of slate and sandstone.

The total numbers of bacteria for these samples are high for a potable water in good sanitary condition. More than half of the samples show total counts which are excessively high even for a surface impounded water. The results for the tests for the B. coli type of fecal organisms indicate pollution of the sources of supply by animal organic matter. These organisms are repeatedly found in as small test volumes as 1-10 c. c.

These chemical and bacteriological analyses are consistent with the conditions on the watershed of the public water supply as described in this report. The organic matter affecting the sanitary and aesthetic condition of this supply comes mostly from the cattle and other animals occupying the watershed. Under certain conditions this pollution may be a menace to the public health of the village and should be removed or reduced to a minimum. The population resident on the watershed is small and it is unlikely that, with proper care, any considerable pollution of the public water supply results from organic matter of human origin. As these wastes, however, are the most dangerous and constitute a common source of infection, the exercise of the greatest vigilance is essential to maintain all premises on the watershed in a sanitary condition.

The need for such strict supervision over the conditions on the watershed is emphasized by the conditions surrounding the undue prevalence of typhoid fever occurring in the village in 1909. After an investigation by the Department of this outbreak it was decided that the probable cause of the cases occurring in the village was an infection of the water supply and in view of this conclusion every precaution should be taken by the village authorities to insure against any further continuance of conditions at the various properties on the watershed which menace the quality of the public water supply.

I beg to submit the following conclusions regarding the sanitary conditions surrounding the public water supply of the village of Richmondville:

1. That the springs, and the surface water impounded on the watershed of the springs, furnish the village with an adequate supply of water of reasonably good physical and aesthetic quality.

2. That because of the considerable amount of ground water in this water supply and because of its storage in an open reservoir that at times there is a development in the reservoir of the lower forms of algae in sufficient numbers to impart tastes and odors to the water.

3. That the sanitary quality of the water is injured by the organic pollution from cattle on the precipitous slopes of the watershed adjacent to the reservoir, from cattle having access to the streams, from the entrance of cattle into the reservoir itself and from barn-yards and animal enclosures on steep or precipitous slopes near the streams.

I would therefore make the following recommendations:

1. That a suitable fence be placed by the water commissioners around the land owned by the village adjacent to the reservoir, and maintained at all times in proper repair and in such manner as to prevent access of cattle or other animals to the reservoir.

2. That the board of water commissioners take steps to prevent the pollution of the spring streams by cattle and the drainage from barn-

yards and animal enclosures, and that
Department for the enaction of rules
protection of the public water supply.

3. That the board of water commiss
tion to be made of all the dwellings a
shed with a view of ascertaining anc
pollution and correcting any conditions
privies or any other sources may be ca
the water ultimately flowing into the

4. That frequent and regular inspectic
of the board of water commissioners
tributary to the reservoir to prevent a
careless pollution of the springs and st

Respectfully

Copies of this report were inclosed in lette
of Water Commissioners and to the local Boa

ROSENDALE

ALBA

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following repo
by the Engineering Division in the matter of the
village of Rosendale.

Rosendale is an incorporated village in the ea
county and eight miles south of the city of Kingst
Railroad. The village occupies both banks of R
about 2¾ miles above its confluence with the W
is well known for its manufacture of natural or "
the large deposits of hydraulic limestone existing i
in this industry, however, has greatly decreased in
more universal use of portland cement. The present
is about 1,800.

The public water supply is derived from two g
these is a small reservoir in the southeastern ex
This is a small earth reservoir with a low masonry d
side. This reservoir has a comparatively small w
not more than 70 acres, and it is probable that the
from springs which are tributary to the small strea
voir and flowing northerly into the Rondout creek jus

The second source of supply is from a large res
Shawangunk range about 1¼ miles south of the villag
from a mountain stream and is impounded in an eart
a masonry dam built across a narrow part of the ra
of this stream is long and narrow, extending almost
tween two well defined ridges of the mountains. It i
in length, about 3/16 miles in average width, and is a
mile in area.

The elevation of the small reservoir near the village i
nish adequate pressure for purposes of fire protection, and
auxiliary supply. Ordinarily the distributing system of
village served from this supply is shut off from the dist
the remainder of the village which is supplied under high
large reservoir in the mountains. By the proper arrangem
ever, it is said that all parts of the village can be served
water in case of fire or whenever necessary.

The examination of the public water supply of the village of Rosendale by the engineering division was made in pursuance of a policy instituted by the State Department of Health, some years ago with the purpose of obtaining a record of the physical and sanitary characteristics of the surface water supplies of the State to the end of removing any dangerous or undesirable conditions which might affect the public health.

The investigation at Rosendale was made on February 6, 1912, by Mr. A. O. True, assistant engineer of this Department. The assistant engineer was accompanied by Dr. C. V. Hasbrouck, health officer of the village, and was assisted in obtaining information concerning the water works by Mr. James Brown, the superintendent.

In general, and with the exception of one opportunity for serious pollution, good sanitary conditions were found on both watersheds of the public supply. The watershed tributary to the smaller reservoir is uninhabited and is for the most part covered with trees of large growth. There are no low or marshy areas and the bed of the stream is of hard material and free from any considerable quantity of vegetable organic matter. Though free from any sources of permanent or direct pollution this watershed is almost directly adjacent to the village, and therefore should be under very careful supervision and subject to frequent and regular inspection by those having charge of the public water supply in order that any careless or accidental pollution be anticipated and prevented. Although I understand that the woods on the watershed are not used for pleasure or picnic parties, its proximity to the village and its scenic attractions would invite residents or visitors to the locality in the summer season.

The watershed tributary to the larger reservoir is a narrow depression between two ridges of the Shawangunk mountains. The surface is rough and in many places precipitous toward the stream. The rock is of the well known Shawangunk grit stone and the thin soil is well wooded with a growth of small trees. There are two houses on this area. One is owned by the village and occupied by a tenant. It is about 300 feet from the stream on an undeveloped spur of the highway and about ⅝ of a mile south of the reservoir. No insanitary conditions were found here or any indication that dangerous or undesirable drainage would be likely to be carried directly into the stream above the reservoir. This habitation, however, should be at all times under careful and direct supervision by the water commissioners to prevent any possibility of drainage from the privy, animal enclosures or sinks from being carried or washed over the surface of the ground into this stream.

The other house on the watershed is about three-eighths of a mile further south at the end of this undeveloped road. The house is on rather flat ground about 100 feet from the stream. The barn is a short distance to the north and on the other side of the road. The barnyard extends across the stream and whatever drainage there is from it enters the stream directly. The privy for the house is directly on the edge of the stream at a point nearly opposite to the house. It has no vault, was in a bad condition at the time of inspection, and could not help but be a source of direct pollution to the water supply.

The results of analyses of samples of the public water supply of Rosendale made at the State Hygienic Laboratory and expressed in parts per million are given in the following table.

REPORT OF WATER ANALYSIS FOR VILLAGE OF Ro

Laboratory number	B-4482 C-2580	B-4913 C-2923	B-5219 C-3177
Source	Tap	Tap	Tap
Collected on	1/9/11	3/24/11	5/19/11
Color	5	20	5
Turbidity	Clear	15	Clear
Odor, cold	1 v.	2 v.	1 v.
Odor, hot	1 v.	2 v.	1 v.
Solids, total	61	65	81
Loss on ignition	21	20	11
Mineral residue	40	45	70
Ammonia, free	.012	.016	.006
Ammonia, albuminoid	.033	.138	.050
Nitrites	.001	.002	.002
Nitrates	0.70	0.10	0.80
Oxygen consumed	1.15	4.80	1.50
Chlorine	2.25	1.75	2.50
Hardness, total	39	27.3	57.1
Alkalinity	38	25	41
Bacteria per c.c.	500	2,100	80
B. coli type	10 c.c. + 1 c.c. — 0.1 c.c. —	10 c.c. .... 1 c.c. .... 0.1 c.c. +	10 c.c. + 1 c.c. — 0.1 c.c. —

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2 decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; musty; v, vegetable.

From these results it is seen that this supply contains small amount of hardness. The results indicate that the v to the village is usually free from turbidity, but is some color. The sample of March 24, 1911, was somewhat high excessively so. This color is probably due to vegetable considered objectionable in moderate amount. The organ water at the time the samples were taken was somewhat for free ammonia were, with one exception, rather large, i what active decomposition of organic matters having rec water with reference to the time of collecting the samples chlorine content are somewhat, but not greatly, above locality.

With one exception the total numbers of bacteria foun are not excessive for a surface impounded water. The re tions for the B. coli type of bacteria would indicate that w of the samples March 24, 1911, the number of these intestin at no time large.

Taken collectively these analyses would indicate that usually free from any undue or dangerous pollution by ani ter, but that it was probably subject to intermittent pollu acter. This is shown in the sample of March 24, 1911, in c other samples. Such a limited number of analyses does no evidence for an authoritative interpretation but it is no March analysis is markedly high in those characteristics wh of animal pollution. These analyses are also consistent wi found to exist upon the watershed of the large reservoir.

These conditions and indications do not imply that any water has taken place or would occur unless a case of com should develop upon the watersheds. The danger lies in th case of sickness occurring where the infected wastes might supply through those channels through which, at the present animal wastes intermittently pass.

In summarization I would submit the following conclusion

1. That in general the catchment areas of public Rosendale are in good sanitary condition.

The waterworks were built in 1896 by the board of \
The main reservoir was built in 1905. The works are a
operated by the village. Practically all of the populati
served by the public water supply. No data is directly
average daily consumption of water. There are about 6(
six of which are metered.

The investigation of this water supply was made on Se
Mr. A. O. True, assistant engineer of this Department,
accompanied and assisted by Dr. O. T. Barber, village h
Millson M. Basset, a civil engineer of Silver Creek.

The area of the watershed above the reservoir is appr
miles. Time did not permit of an inspection of all par
The area is intersected by several main highways and a
Erie railroad passes through the central part of the wat
of about 3½ miles. The extreme upper parts of the wate
waters of the main streams appear from the United Stat
map to be sparsely populated. There are many opportu
water which has come in contact with the highways flo
stream, for a fouling and possible pollution of the water t
voir.

There are many pasture lands bordering on the main
opportunity for pollution from animal wastes through su
slopes and by cattle entering the streams. A similar cl
also occurs in a greater or less degree from drainage of
slopes bordering the streams.

About 1¾ miles above the reservoir there is a farm
just east of one of the main tributaries. The barnyard e
edge and drains directly into the stream. There was a
of manure at the time of inspection near the water's edg
above the reservoir there is a farm house and prem
bank of the tributary. Here the barnyard drains almo
stream. The privy vault has a leaky container and is lo
of high water mark of the stream on such a slope as to
it. The waste water from the kitchen is discharged in
into the stream but a few feet distant. Across the ro
manure pile directly on the bank of the stream. The
tributaries in passing through the watershed about fiv
three passenger trains each way a day.

No seriously insanitary conditions were noted at the
immediate watershed. This reservoir is long and narrow
on the northern side. The highway is located along th
the water on this side of the reservoir is separated from
water supply by a longitudinal dike. There is some opp
contamination from the road near the eastern end of the
dike. The main flow of Silver creek does not pass throu
on the south side of the above mentioned dike. Water
reservoir through an intake pipe near the eastern end wh
roadway. The intake is at the foot of the roadway emb
tected by a coarse vertical bar screen. Near the western
are some houses and an insanitary privy, but they are a
elevation than the embankment and the water level at t

The results of the analysis of samples of water collecte
and the distributing system in 1908 and 1910 and at the
tion, September 18, 1912, are given in the following table

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical				Chemical (Parts per Million)											Bacteriological			
							Odor		Solids			Nitrogen as —						Hardness			B. Coli Type + = present − = absent		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
....	Silver Creek...	Chautauqua..	Reservoir Smith's Mills..	3/26/08	9	19	....	....	97	....	....	.008	.086	Tr.	0.24	2.00	2.00	‘1.4	...	......	+	+	−
....	Silver Creek...	Chautauqua..	Tap, public supply.....	4/ 6/08	8	10	....	....	111	....	....	.006	.112	.001	0.24	3.30	1.75	84.3	...	8,600	+	+	......
....	Silver Creek...	Chautauqua..	Tap, public supply.....	3/25/10	10	15	....	....	91	....	57	.012	.046	.001	0.40	2.10	1.25	40.3	29	4,100	+	−	−
B-8601	Silver Creek...	Chautauqua..	Reservoir upper intake..	9/18/12	......	......	....	....	....	....	....	....	....	....	....	....	....	......	...	2,400	3+0−	3+0−	3+0−
B-8600 C-5846	Silver Creek...	Chautauqua..	Reservoir near outlet....	9/18/12	20	12	2m.	2m.	164	24	140	.032	.148	.001	0.06	3.30	2.75	111.0	93	1,000	3+0−	3+0−	1+2−

They are few in number and alone give but rather meager to the character of the water at all times. They would in that the water is usually in poor physical and sanitary condit the water is at times subject to considerable turbidity and September 18, 1912, the samples gave a faint musty odor whi of the physical evidence of small quantities of sewage. Th though not excessively so.

The nitrogenous organic content of the samples is not exc face water supply. The chlorine values are much higher th

The bacteriological analyses are all unsatisfactory. All th total counts are excessively high and the B. coli type of orga in the small test volumes indicating contamination by anima

In the light of the conditions shown to exist by the inspecti that there is a considerable pollution of the water by mo drainage of animal inhabited areas, manured land, barnya to a lesser extent, drainage from house wastes and privies. fouling of the water by the run-off from roads at points wh steep or precipitous, especially at times of intense rainfall.

In view of the results of this investigation I beg to sub conclusions:

1. That the public water supply of Silver Creek as pounded at Smith's Mills is subject to considerable dir animal organic matters having their source in barnya pasture lands, manured land, and to some extent, privy water from dwellings.

2. That while there probably has been as yet no infec supply the insanitary conditions on the watershed are to the public health in the event of the occurrence of on the watershed, and are at all times a great injur quality of the water.

3. That while it would be practicable to reduce the tion by a strict enforcement of rules and regulation Department for the sanitary protection of the villag accordance with sections 70 to 73, inclusive, of the P it would probably be impracticable because of the siz the watershed to eliminate all dangerous sources of supply.

I would therefore recommend

1. That the board of water commissioners proceed stalled a modern plant for the purification of the vil This plant should be installed only after a careful stu competent engineer of local conditions and as to the and capacity of such purification works.

2. That in order to reduce to a minimum the preser tion on the watershed and thus relieve the load to be fication plant, the board of water commissioners ap ment for the enactment of rules and regulations for th contamination of the watershed of their supply.

3. That awaiting the carrying out of these protec measures against existing and future pollution of th in order to remove at once the serious menace to pub exists from the pollution upon the watershed, the b missioners make at once a thorough inspection of th purpose of ascertaining and removing so far as pos tion; and that they maintain a strict sanitary patrol to discover any cases and guard against any infection or other communicable diseases.

4. That if these temporary precautionary measures prove to be inadequate or difficult of attainment, the board of water commissioners consider at once the installation of a temporary chlorinating plant for the sterilization of their supply until the more permanent and efficient purification works are installed.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were transmitted to the board of water commissioners and to the local board of health.

SLOATSBURG (Town of Ramapo)

A petition, signed by some seven citizens of Sloatsburg, requesting an inspection of the water supply having been received by this Department, an inspection was accordingly made. The following report contains the findings of this inspection.

ALBANY, N. Y., *October* 7, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an investigation of the public water supply of the village of Sloatsburg.

Sloatsburg is an unincorporated village located in the western part of Rockland county on the right bank of the Ramapo river. It is on the main line of the Erie railroad 36 miles from New York city. The present population is estimated at 1,300.

The public water supply is derived from a watershed lying in the Ramapo mountains southwest of the village. There are two relatively large storages in the lower part of this watershed. The lower of these is an artificial body of water of irregular contour, and for the most part very shallow. It is known as Nigger pond. The other storage lies between two spurs of the mountains, and is designated on the United States government maps as Portage lake. It appears to be a natural lake, though its level has been raised some years ago by a dike at its lower or northern end. The greater part of the watershed above the waterworks intake lies in the State of New Jersey. Nigger pond and the greater part of Portage lake are in the State of New York.

The intake of the system is located at a small dam on the stream about 1,000 feet below the dam at the outlet of Nigger pond. There is a small distributing reservoir at this point.

The distributing system consists of approximately 3 miles of cast-iron and wrought-iron water mains, ranging from 2 inches to 10 inches in diameter. No information was directly available as to the average number of pounds pressure per square inch existing in the water mains of the village, but it is well known that the pressure is at all times low and usually entirely inadequate for fire protection even if it were available for such purpose. As there are no fire hydrants the system cannot afford any public fire protection.

The waterworks are owned and operated by the Pothat Water Company of Ramapo, N. Y. Mr. J. Fred Pierson of Ramapo is president of this company. Mr. J. O. Stitt of Stirlington, N. Y., is superintendent of the waterworks. About 175 people are said to be served by this public supply in Sloatsburg and some 50 in Ramapo. No data are available as to the average daily consumption. About 90 per cent. of the supply is used by the Erie railroad. There are about 35 service taps, of which about 5 are metered.

The investigation of these waterworks was made by Assistant Engineer A. O. True on September 23, 1912. The assistant engineer was accompanied by Mr. J. M. Taylor of Sloatsburg. Information concerning the works was kindly given by Mr. Stitt, the superintendent.

As already stated, the watershed tributary to this public supply is mostly in New Jersey — the interstate boundary passing through the southern end of Portage lake. This watershed above the waterworks intake has an area of about 3¾ square miles. The area of Portage lake is approximately 50 acres, and that of Nigger pond approximately 75 acres. Above the lower end of Portage lake there is practically no population on the watershed, almost the entire area being rough and mountainous and having no main roads or thoroughfares. There are some secondary roads and trails. There is a boathouse at the northern end of Portage lake. This lake appears to be an excellent source of potable water supply. The water is deep and appears to be retained in a hard and rocky basin between the mountains. The immediate watershed is thickly wooded. A pipe conduit provides a means whereby water from the lake can be discharged into Nigger pond situated just below Portage lake and at some 60 feet lower elevation. Several mountain streams which are independent of Portage lake flow into Nigger pond.

The water entering Nigger pond from the west is subject to some contamination from surface water from highways in that part of the watershed. There is also at times of rain some surface water from a highway discharged directly into Nigger pond at the viaduct crossing an arm of the pond, which is some 300 feet in width, in the northern part. There are several buildings on the shores of this pond. There is a dwelling house 100 feet east of the dam and outlet. This is occupied by the superintendent. The privy on these premises and a barn in which are kept a horse and cow are more than a hundred feet from the margin of the pond. On the opposite side of the outlet there is a barn directly on the high water mark. It contained a horse stall and there was a calf tied there at the time of the inspection. On the western side of the pond there is a dwelling house on a knoll located about 75 feet from the water's edge. The privy was not less than 100 feet from the water measured along the natural drainage line. There were evidences of rubbish having been thrown from these premises into the edge of the pond.

Nigger pond is an unsuitable reservoir for the storage of potable water. The site is said to have formerly been a cranberry marsh which was not stripped or cleaned of its organic accumulations when the water was raised by the construction of the dam. For the greater part of the area the water is extremely shallow and filled with aquatic growths. The shores and bottom are of a deep, soft muck and there is abundant evidence of vegetable decay. In fact it would appear that clear waters of Portage lake, composed largely of mineral-bearing ground water, are discharged into the shallow area of Nigger pond, giving rise to conditions most favorable for the rapid growth of objectionable algae.

The outlet from Nigger pond flows in a narrow ravine passing under the highway to the distributing reservoir some 1,000 feet below. This reservoir is formed by a small "cob-house" dam on the stream about 175 to 200 feet below the highway bridge. It is about 50 feet long, averages 45 feet wide and is some 4 to 8 feet deep, according to the stage of the streams. At the time of the inspection it was low and heavily silted with mud. There are some pasture lands draining toward the outlet of Nigger pond above the reservoir. At the highway bridge above the reservoir there is a house situated on a fairly steep slope and 40 feet from the stream. It has a deep privy vault some 70 to 80 feet from the stream.

Some ice is obtained from both Portage lake and Nigger pond.

The results of analyses, in parts per million, of samples of this public water supply collected at the time of inspection and analyzed at the State Hygienic Laboratory are given in the following table.

REPORT OF WATER ANALYSIS FOR HAMLET OF SLOATSBURG

Laboratory number	B-8640 C-5874	B-8641	B-8642 C-5875
Source	Portage lake	Lower reservoir	Tap public supply
Collected on	9/23/12	9/23/12	9/23/12
Color	5	....	30
Turbidity	Trace	....	10
Odor, cold	1 v.	....	1 v.
Odor, hot	1 v.	....	1 v.
Solids, total	44	....	69
Loss on ignition	10	....	33
Mineral residue	24	....	36
Ammonia, free	.004	....	.004
Ammonia, albuminoid	.056	....	.136
Nitrites	.001	....	.001
Nitrates	.02	....	.12
Oxygen consumed	.80	....	5.40
Chlorine	1.50	....	2.50
Hardness, total	23.4	....	27.3
Alkalinity	8.0	....	20
Bacteria per c.c.	900	1,100	350
B. coli type	10 c.c. 3+0— 1 c.c. 2+1— 0.1 c.c. 0+3—	10 c.c. 3+0— 1 c.c. 1+2— 0.1 c.c. 0+3—	10 c.c. 3+0— 1 c.c. 1+2— 0.1 c.c. 0+3—

Results are expressed in parts per million. + Present. — Absent.
Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

The chemical analyses of Portage lake water would indicate a relatively soft water free from any considerable color or turbidity. The sample contained but a moderate amount of free and albuminoid ammonia, and but a small amount of mineral nitrogen as nitrates. It also contained but a moderate amount of carbonaceous organic matter. The value of 1.5 parts per million for chlorine is normal for this part of the State. The bacteriological analysis of this lake water is less satisfactory than would be expected with a water showing such satisfactory sanitary chemical analyses. The bacterial count of 900 per c. c. is rather, though not excessively, high for a surface water in the best sanitary condition. The tests for the B. coli type of fecal bacteria are also unsatisfactory as this type was found in as small test volumes as 1 c. c.

The bacteriological results of the sample collected from the lower or distributing reservoir are unsatisfactory — the total count of 1,100 bacteria per c. c. being rather high — and fecal organisms being somewhat prevalent. The sample from the tap on the public supply in the village gives opportunity for a general comparison of the village water at the time of this inspection with the water from Portage lake. The chemical analysis would indicate that the Portage lake water is of better physical and sanitary quality than that in the village mains. The latter at that time was higher in color, turbidity and nitrogenous and carbonaceous organic matters. The chlorine of the tap water was also higher than normal. The bacteriological analyses of the tap water does not indicate a sanitary inferiority of this water as compared with that from Portage lake, as the samples from both these sources exhibited a somewhat high bacterial content and show a prevalence of fecal organisms. The results, however, of but one bacteriological analysis of each source do not furnish a just basis of comparison as bacteriological tests are extremely delicate and greatly influenced by accidental circumstances. From a consideration of the surroundings of Portage lake as compared with other sources tributary to the village mains I think it could be safely predicted that a series of samples from Portage lake would show more satisfactory bacteriological results than a comparable series from the village mains as now supplied.

From the inspection of these works and the results of analyses of s from various parts of the works I beg to submit the following conclu

1. That Portage lake, because of the favorable location and p character of its watershed, with reference to freedom from any c able permanent sources of animal pollution and undesirable effec decaying vegetation or suspended mineral matters is a desirabl of public water supply, which can be delivered to the village by under reasonably good pressure for fire protection and other pur

2. That the watershed of Portage lake alone, which is estin ¾ to 1 mile in area, is probably insufficient to sup quantity of water now taken from these works for both house railroad purposes, but is probably sufficient for the domestic sup in Sloatsburg and Ramapo for some years to come.

3. That Nigger pond is unsuitable as a place of storage for potable purposes because of the large accumulations of organic matters forming its bed to great depths and because o lowness favoring the multiplication of objectionable algae grov

4. That the present distributing reservoir is considerably with mud, apparently brought down by the stream from Ni This reservoir is also at too low an elevation to give adequate the village mains even under the most favorable conditions w to quantity and draft.

5. That the distributing system of the village was not p signed with a view of serving the houses under reasonable a water pressure, and no provision was made for fire protecti

In view of these conclusions I submit the following recomm

1. That in view of its unsuitableness as a storage for p supply and the opportunities for animal pollution of its wa pond be abandoned for household water supply.

2. That the intake and headworks for the supply for ho poses be placed at Portage lake, and that mains of adequat from the lake to the village and in the village to maintain a proper pressure for fire protection.

3. That the main supplying the village for household separate from the mains supplying the railroad with wate pond, and that all water for drinking purposes at the ra or any places supplied by these works be taken from the m with Portage lake supply. That if necessary in the fut obtained from Portage lake be augmented by the intercep water now flowing into Nigger pond at such elevation brought into the system by gravity.

4. That the village distributing system be equipped v number of suitable fire hydrants to provide adequate fi the village.

5. That regular and frequent inspections be made of and reservoirs from which the public water supply is vent any accidental or other dangerous pollution of th

6. That no one be allowed upon the watersheds or r purpose of ice cutting, boating or other operations wh in contamination of the water, except under the strict s water company.

Respectfully submitted,

THEODORE H

Copies of this report were transmitted to the Pothat W the local board of health and to the petitioners.

WARRENSBURG

An inspection was made after a conference between representatives of the Warrensburg Water Company and of this Department, in which the sanitary quality of the water supply was considered, especially in reference to the results of recent analyses of water made by this Department. The following report contains the findings of this inspection.

ALBANY, N. Y., *January* 17, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation made by the engineering division in the matter of the public water supply of the village of Warrensburg.

Warrensburg is an unincorporated village in the southeastern part of Warren county occupying both banks of the Schroon river about 2½ miles above the confluence of that river with the Hudson. The village is about 15 miles northwest of the city of Glens Falls and is the northern terminus of the Hudson Valley electric railway. The population is about 2,000.

The public water supply for Warrensburg is obtained from several small watersheds in the mountains directly south of the village.

The smallest of these, known locally as Harrington brook, is about 1½ miles south of the village. The water is diverted by a small dam across the stream and flows in a cast-iron pipe directly to the main supply pipe from the reservoir to the village joining the main at a point some distance below the reservoir. The area of this watershed above the intake is about ¼ of a square mile.

The second watershed is that of a tributary to Big brook. In the reports of the results of analysis of the various sources of water, to be spoken of later, this supply is designated as the Middle brook. It lies about 3 miles south of the village, and has an area of about 1 square mile above the point of intake. There is a small masonry dam across the stream from which a cast-iron pipe discharges the water into the reservoir which is located about ¾ of a mile north between Harrington brook and Big brook.

The third watershed is that of the headwaters of Big brook, which adjoins that of the middle brook, and is also about 1 square mile in extent. There is another masonry dam on the stream and a cast-iron pipe conveys the water to the reservoir, a distance of about a mile.

The storage and distributing reservoir is on the side of the mountain about midway between Harrington brook and Big brook at a point 1½ miles south of the village. It is an artificial pond lying in a depression of a bench in the mountain. Short lengths of masonry wall have been built on the northern and northeastern edges of the pond in order to increase its capacity. It is a somewhat irregular body of water roughly 300 feet long and averaging about 125 feet in width. It is said to be about 6 or 8 feet in maximum depth and probably holds roughly 900,000 gallons when full.

It is at an elevation of some 350 feet above the mean elevation of the village furnishing an average pressure of about 150 lbs. per square inch.

The waterworks are said to have been constructed about 24 or 25 years ago. They are owned and operated by the Warrensburg Water Co., of which Mr. L. W. Emerson is president. About 80 per cent. of the population is said to be served by the public water supply.

An investigation of the public water supply of the village of Warrensburg was made on January 3, 1912, by Mr. A. O. True, assistant engineer of this Department. The assistant engineer was accompanied by James E. Goodman, M.D., health officer of Warrensburg. An inspection was made of the watersheds, the intakes and the reservoir, and samples of water from analysis were collected from the various sources and from the distributing system.

Good sanitary conditions were found to obtain on that part of the watershed of Harrington brook tributary to the village water supply. This watershed is uninhabited. The highway passes through it for a distance of about ¾ of a mile and at about an equal distance from the intake. A small amount of surface water from the road would probably drain more or less directly into the stream during heavy rains.

The Middle brook watershed is similar in character
It is uninhabited. The highway passes along the valle
distance of about a mile, and is about a quarter of a mi
its nearest point.

Upon the Big brook watershed there are said to be liv
ple. Several sources of possible direct pollution were
ises situated along the road passing through this water
about ⅛ of a mile. About 600 to 800 feet above the in
unoccupied house on the western side of the road. It is
ing to the stream. The privy is in the rear of the p
feet from the stream. While there is little opportunit
water supply at the present time, the house being uno
tion would become a menace to the consumers of the p
the event of the occupation of the premises or even sho
occasionally by those in the vicinity.

About ¼ of a mile further up the brook there is an
on the eastern side of the road. The house is well rem
and there is little likelihood that any polluting substa
directly into the water supply from the house or the
The barn and barnyard, however, are on the opposite
precipitous slope draining into a small watercourse tri
There is considerable opportunity at this point for anin
drain or be washed into the water supply.

Continuing in the same direction up the stream about
another house on the west side of the highway. These
but are on flat territory and located several hundred
stream.

About a quarter of a mile above, the road crosses the
this crossing there is a house located very near the st
cated in the rear of the premises, is about 40 feet fro

Good sanitary conditions were found to exist at the
ception of several less important conditions which can
About 300 feet east of the reservoir, and higher up the
pied house with barn and other buildings. Although the
the reservoir and on a steep slope, the immediate topogr
drainage therefrom would not reach the reservoir, but
below. There is an animal enclosure on the side of a k
the water about 40 feet from which any drainage would
voir. The land surrounding the reservoir is used for th
head of cattle. Part of this pasture land lies in the sm
tributary to the reservoir. The reservoir is partly fenc
needed repairing at the time of inspection.

Samples of the water from the several sources of supp
the village were collected at this time and sent to the S
atory for analyses. The results of these analyses toge
of the analyses of this water supply made during 1911 b
Laboratory are given in the following table.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical				Chemical (Parts per Million)											Bacteriological			
							Odor		Solids			Nitrogen as—						Hardness			B. Coli Type +=present —=absent		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
B-5090 C-3069	Warrensburg...	Warren......	Tap on public supply....	4/26/11	25	Trace	1 v.	2 v.	29	20	9	.004	.056	.001	0.10	3.00	0.87	7.9	6	40	0+3—	0+3—	0+3—
B-6296 C-4021	Warrensburg...	Warren......	Tap on public supply....	11/ 9/11	45	Clear	1 v.	1 v.	45	21	24	.008	.142	Tr.	0.10	7.20	0.50	14.3	8	500	3+0—	3+0—	1+2—
B-6606 C-4288	Warrensburg...	Warren......	Tap on public supply....	12/13/11	20	Clear	1 v.	1 v.	43	26	17	.014	.058	Tr.	0.14	4.00	1.50	15.6	9	195	3+0—	1+2—	0+3—
B-6722	Warrensburg...	Warren......	Tap on public supply....	1/ 3/12	......	......	....	....	....	....	....	....	....	....	....	....	....	....	....	130	2+1—	0+3—	0+3—
B-6719	Warrensburg...	Warren......	Harrington brook......	1/ 3/12	......	......	....	....	....	....	....	....	....	....	....	....	....	....	....	160	1+2—	0+3—	0+3—
B-6721	Warrensburg...	Warren......	The Middle brook......	1/ 3/12	......	......	....	....	....	....	....	....	....	....	....	....	....	....	....	120	1+2—	0+3—	0+3—
B-6720 C-4392	Warrensburg...	Warren......	Big brook..........	1/ 3/12	25	Trace	1 v.	1 v.	43	8	35	.022	.048	Tr.	0.20	3.70	1.37	12.7	7	170	3+0—	0+3—	0+3—

From this tabulation of results it is seen that this su as a soft water, the largest value for total hardness bein parts in a million. This would be expected from the g the region. The village occupies a position on the sou the vast region of igneous rock covering a large part York, and therefore the water escapes the influence of t abundant in the Hudson River valley below Warrensbur southern shores of Lake George.

The water is moderately high in color which is und table stain. This is not of direct importance from a sa was free from turbidity at the time of the collection of results of the determination for nitrogen would indicat ately large but not excessive amount of nitrogenous values for free ammonia were moderate and the nitrit were low. Albuminoid ammonia values were moderately for organic nitrogen would indicate that the water contai than average amount of organic matter, the greater pa stable character and that there was little activity in th position of organic matters.

Coming to the bacteriological determination, the t teria are with one exception reasonably low for a supply fed largely by surface run-off. The results of the examin isms of the B. coli type are in the majority of tests satisf the presence of but few of these intestinal bacteria in t of collecting the samples. Two samples, however, woul isfactory condition of those of November 9, 1911, and De former gave positive results for B. coli type in 10 c. c., of the water taken for analysis. The total bacterial co for this sample was also excessive. In the December 13, type was found in one of the 1 c. c. quantities of the wa

The results of tests for B. coli, or other fecal organ preted quantitatively and the standards for such inter sarily somewhat arbitrary and their significance can usu by a study of all the characteristics of the water, both c logical, in the light of a knowledge of the actual phys which the water is derived.

Almost all surface water supplies are subject to at from small amounts of animal organic matter. Many plies from surface sources which are protected by vigi inspection of the watersheds and are considered safe u cumstances contain small numbers of B. coli. It is ordi the isolation of B. coli from as large samples as 10 c. c. no important sanitary significance. The appearance of ever, in smaller samples, is looked upon with suspicion, a pearance in very small quantities of the water exami evidence of sewage pollution.

The results of these analyses of the Warrensburg wat ent with the observations made of the conditions on the of inspection.

In the light of these observations it might be said tha ably soft, free from turbidity, somewhat colored and car than a moderate amount of organic matters. Fecal ba sent or only present in small quantities. On two occasi have been made, fecal organisms have been present in a c. c. and 1/10 c. c., indicating a probable intermittent i pollution into the water supply by rain or melting snow not necessarily from human sources, as barnyard or si cause the same results. The danger to be guarded ag supply lies in an unforeseen, chance or careless infectio nating in a case of sickness on the watershed and enter nels indicated.

From a consideration of the conditions under which this water supply is collected, stored and delivered to the village, as outlined above, together with the results of the analysis of samples of the water collected at various times, I beg to submit the following conclusions:

1. That the general sanitary and physical conditions, with the exception, in several instances to be mentioned, are satisfactory upon the several watersheds from which this public water supply is derived.

2. That with the exception of a slight excess of color and the occasional prevalence of tastes and odors from algae growths, the water derived from these mountain areas, which are sparsely settled and composed of hard rocky material, is of excellent physical and aesthetic quality.

3. That more or less animal organic matter from pasture lands, barnyards, animal enclosures, etc., and possibly, to a very small extent, from human sources, reaches the stream above the intake. The green growths which appear in the reservoir are probably due to the fact that the slow oxidation of this nitrogenous organic matter furnishes the necessary food supply for their sustenance. The growth of such lower plant life in a reservoir is not necessarily an indication of organic matter which is dangerous to health but its presence in large quantities often results in disagreeable tastes and odors which, on decaying, it imparts to the water.

4. That the results of the analyses and the inspection of the watersheds would indicate that most of the organisms indicative of slight amounts of animal organic matter come from those buildings, barnyards and animal enclosures on the Big brook watershed where, as has been pointed out, direct pollution is probably possible.

In conclusion I would make the following recommendations:

1. That the condition at the various premises along Big brook which cause or may cause a pollution of the water supply be corrected by the Warrensburg Water Company by —

a. Removing the sources of pollution to such a distance from the streams or lines of surface drainage as to prevent any direct discharge of organic matter into the water or where such removal is impracticable,—

b. By the construction of watertight vaults or removable watertight receptacles for the retention and storage of all excrementitious and animal organic matters which shall be periodically removed to some suitable place of disposal by burying or other suitable means such as to prevent any pollution of the water supply.

2. That conditions at the reservoir be improved with reference to the prevention of surface wash and drainage into the reservoir from any ground which may be occupied by animals and also to preventing stock from approaching or entering the reservoir.

3. That the keeper of the waterworks be required to make regular and frequent inspections of the whole watershed of each source of supply and of the immediate surroundings of the reservoir in order to discover and abate any conditions causing a direct pollution of the water or any accidental or wilful pollution.

4. That should further trouble be experienced from tastes and odors due to algae growths in the reservoir the water company endeavor to correct these conditions by the judicious application under the supervision of an expert of minute quantities of copper sulphate to the water in the reservoir.

5. That if the water company experience any difficulty in preventing any pollution of the public water supply that they apply to this Department for the enactment of rules and regulations for the sanitary protection of the public water supply of the village.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were transmitted to the Warrensburg Water Company and to the local board of health.

WELLSBURG

ALBANY, N. Y., *August* 21, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon a recent investigation of the public water supply of the village of Wellsburg.

Wellsburg is an incorporated village located in the southern part of Chemung county in the town of Ashland and about ¾ of a mile from the New York-Pennsylvania State line. It is on the main line of the Erie railroad about nine miles southeast of the city of Elmira, and on the right bank of the Chemung river. The present population is about 500.

The public water supply is derived from several driven wells in the southwestern part of the village. The water is pumped in a station adjacent to the wells directly into the distributing system. The pressure in the system is equalized and storage provided by a small reservoir on a hill directly east of the village.

The distributing system consists of about a mile of cast-iron water mains ranging from four inches to eight inches in diameter. The average water pressure in the distributing system in the village is about 90 lbs. per square inch.

The waterworks were built by the village about 18 years ago. They are at present owned and operated by the village under the direction of a board of water commissioners. Mr. A. L. Hamner is chairman of this board.

Something like one-half of the inhabitants of the village are served by the public water supply. There are about 50 service taps, none of which are metered. There are no gaugings from which the average daily consumption of water can be estimated.

It is said that the draft on the system in the village lowers the water in the reservoir about 5 feet in 3 days. This would indicate, since the pumping is only intermittent and but for a few hours at a time, that the average daily consumption is in the neigbhorhood of 50,000 gallons per day. This would seem a high figure even including waste.

The investigation of this water supply was made by A. O. True, assistant engineer of this Department. The engineer was accompanied by Dr. F. G. Dean and one of the members of the board of water commissioners.

The four 8-inch driven wells from which the supply is derived are located in the southwestern part of the village in a lot near the intersection of two of the built up streets. A creek flowing northerly into the Chemung river is about 400 feet to the west of the wells. The ground immediately surrounding these wells is flat as in all the region occupied by the central part of the village. There is a slight slope toward the creek which skirts the base of a hill rising abruptly on the west from the plain occupied by the village. To the south and west of the wells and within a radius of 200 feet there are some six houses. These houses are not connected with the public water supply and there are no cesspools in this area. There are privy vaults in the rear of the premises in question, but none within a radius of probably 150 feet of the wells. The wells are 28 to 30 feet deep and occupy a small area a few feet from the street line. They are said to have been driven through a small depth of top soil into gravel, and at 10 feet below the surface a heavy clay was encountered for a distance of about 8 feet. Under this layer of clay, gravel or gravelly black sand was encountered for the remaining 10 or 13 feet to the bottom of the well.

The pumping station is adjacent to the wells. The machinery is housed in a substantial wood and brick building and consists of one Snow-duplex steam pump and a 25 horse-power boiler. The pump has a capacity of 450 gallons per minute.

The storage reservoir is located near the top of a steep hill rising from the plain on the east of the village. It is an open earth reservoir partly in excavation and partly in fill on a steeply sloping beach of the hillsides. In plan it is shaped somewhat like a horseshoe, and is about 80 feet in length by 70

feet in width. The total depth is about 9 feet and the capacity is estimated at 300,000 gallons. There is a circular gate house on the lower side of the reservoir. The inside is of rubble masonry originally plastered with cement or concrete, but apparently at the present time made tight by puddling. The ground immediately surrounding the reservoir is enclosed by a fence.

The land surrounding the reservoir is used for pasturing purposes. On the up hill side the protection against surface wash is probably inadequate to prevent pollution of the water during heavy rains. There is a shallow ditch on this side of the reservoir, but it is questionable if, during heavy showers, it is sufficient to prevent some water from the steep hillside from entering the reservoir more or less directly. At the time of the inspection there were accumulations of manure from the cattle in the pasture along the upper edge of the reservoir only a few feet away from the water.

The results of the analyses of samples of water examined at the State Hygienic Laboratory are given in the following table. As seen from the dates these samples were collected at various times during the last two years.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Physical: Odor: Cold	Physical: Odor: Hot	Chemical (Parts per Million): Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as —: Free ammonia	Nitrogen as —: Albuminoid ammonia	Nitrogen as —: Nitrites	Nitrogen as —: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteriological: Bacteria per c.c.	B. Coli Type (+ = present, — = absent): 10 c.c.	B. Coli Type: 1 c.c.	B. Coli Type: 1-10 c.c.
....	Wellsburg	Chemung	Tap on public supply	5/29/10	Trace	2	....	....	91	....	67	.010	.032	.002	0.30	0.50	2.87	57.1	54	80	—	—	—
B-4584 C-2688 *	Wellsburg	Chemung	Tap on public supply	1/26/11	10	3	1 v.	1 v.	98	27	71	.006	.026	.002	0.60	0.60	5.00	64.3	62	2,500	—	—	—
B-5387 C-3309	Wellsburg	Chemung	Tap on public supply	5/12/11	15	10	1 v.	1 v.	110	18	92	.006	.032	.003	0.20	1.00	3.75	71.4	59	1,500	3+0—	2+1—	0+3—
B-6221 C-3963	Wellsburg	Chemung	Tap on public supply	10/31/11	Trace	Clear	1 v.	1 v.	124	21	103	.010	.034	.002	0.60	0.90	5.25	70.0	66	300	0+3—	0+3—	0+3—
B-6756 C-4421	Wellsburg	Chemung	Tap on public supply	1/8/12	5	Trace	1 v.	1 v.	125	23	102	.018	.042	.001	0.60	0.40	4.25	71.4	70	40	1+2—	0+3—	0+3—
B-7089 C-4702 *	Wellsburg	Chemung	Tap on public supply	2/12/12	Trace	Clear	1 v.	1 v.	106	16	90	.010	.014	Tr.	0.80	0.38	4.37	65.7	63	1,100	1+2—	0+3—	0+3—
B-7544 C-5120	Wellsburg	Chemung	Tap on public supply	3/28/12	Trace	Clear	3m.	3m.	100	23	77	.012	.042	.001	0.80	0.70	4.00	67.1	[illegible]	[illegible]	[illegible]	[illegible]	0+3—
B-7820 C-5362	Wellsburg	Chemung	Tap on public supply	4/23/12	Trace	Clear	1 v.	1 v.	108	23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* 48 hours or more in transit.

From these results it is seen that the water derived from these works is usually free from color or turbidity. It carries considerable mineral content in solution, and would be classed as a hard water, though not excessively hard. The average total amounts of organic matter as determined from the figures for nitrogen and "oxygen consumed" are moderate. The values for nitrogenous organic matters as evidenced in the nitrogen as free and albuminoid ammonia and nitrites are from moderate to considerable for a ground water. About half the samples show values for free ammonia somewhat higher than moderate for a ground water in the best sanitary condition. The figures for albuminoid ammonia would indicate only a moderate amount of unoxidized nitrogenous organic matter. The nitrites are low.

The chlorine content is much higher than normal for all samples. The normal chlorine locality is less than 0.5 of a part per million. In general the chlorine content of that part of ground waters which circulates on or below the surface of the earth is affected by the population on the watershed on which the water is collected from the rainfall. The watershed of the water supplying the ground flow of the public water supply wells of Wellsburg is probably the catchment area tributary to the valley of the creek flowing along the western side of the village above the present pumping station. This stream is of considerable size and has a large watershed lying mostly in the State of Pennsylvania. The presence of soluble wastes from men and animals occupying this area, and especially from those near the wells, probably accounts for the excess of chlorine above normal.

In the passage of ground waters through the soil and underlying strata the chlorine is not removed while the organic content of the water may be removed or undergo chemical change. This is probably what takes place in the water derived from these wells. The organic matters resulting from the disposition of animal wastes on the watershed of the wells ultimately enters the ground water and its slow passage through the porous glacial deposits of the valley frees it of its impurities by oxidation of organic matters and removal of bacteria. The chlorine from the animal wastes remains unchanged and appears as evidence of their past existence in the water. The chlorine is of mineral origin and does not affect the sanitary quality of the water.

The bacteriological results are very variable. The lowest count for total bacteria, as shown by standard methods, is 40 per c. c. and the highest 2,500 per c. c. With the exception of the low count of 40 in the sample collected on January 8, 1912, and the count of 80 in the sample collected on May 29, 1910, the total numbers of bacteria per c. c. are high for a ground water supply. The counts on January 26, 1911, June 12, 1911, and February 12, 1912, are excessively high for a potable water. However, the former and latter of these samples were over 48 hours in transit to the laboratory and the figures for total bacteria may not be representative of the bacterial content at the time of collection.

The tests for B. coli type also indicate a variable sanitary condition of the water. In half the samples this type of fecal organism is not isolated in volumes of the water even as large as 10 c. c., while in two of the samples positive tests were obtained in as small volumes as 1 c. c. These results would indicate an intermittent pollution of the supply by organic wastes of animal origin.

The chemical and bacteriological results are consistent with the conditions on the watershed of the wells and near the reservoir.

As has been outlined above the population resident on the watershed from which the wells derive their supply has an effect on the chemical character of the water. The wastes from men and animals disposed of on the watershed at a distance from the wells probably does not impair its sanitary quality. However, those from the occupants of the houses on the neighboring streets of the village, unless great care and vigilance is exercised, may, under certain conditions, affect the water and menace its safety. If the water from these wells is derived from a strata lying below a thick and extensive strata of clay, it would not be expected that local pollution could reach the wells directly. To guard against any unforeseen and unusual condition, however, or any possible points of porosity in the subsoil near or even at considerable

distances, from the wells, the strictest sanitary control of the wells is essential. Even should such careful supervis all times, it is doubtful if the wells could be considered s all accidental and unforeseen conditions always incident tc pied in such a manner as that in the immediate vicinity ply wells. Although the danger from such conditions can sened by the removal of all possible sources of organic region surrounding the wells, it would seem most desirable stances to relocate the wells on a watershed which is uni reasonable distance from the wells and which can always control of the water commissioners. Or else a new source should be sought which is safe and adequate for future use.

During the time that the present wells are retained as a water supply the danger of pollution should be minimized b all privy vaults from the immediate vicinity or else provi watertight containers which shall be kept in a sanitary cor contents disposed of in a safe manner. Also no manure pi tions of organic matters of any kind should be allowed in

There is in all probability an intermittent pollution of t reservoir at times of heavy rainfall from the surface wash of which are accessible to cattle.

In conclusion I would therefore recommend:

1. That because of the danger of possible pollution of t supply derived from the present wells by the population diate watershed, that the board of water commissioners consider the development of a new source of public water from wells more favorably situated or from other adeq sources.

2. That pending the establishment of a new and safe so supply and during the use of the present wells, that no cess piles and other accumulations of organic matters be allow on the region immediately surrounding the wells; that no tilizers be placed on the land near the wells, and that all p region be removed or provided with removable watertight c

3. That the reservoir be adequately protected from surface construction of deep and suitable trenches and embankment hill side, and enclosed by a strong fence to be maintained at to effectively prevent cattle or other animals from polluting

Respectfully submitted,

THEODORE HOR

Chief

Copies of this report were inclosed in letters transmitted to th water commissioners and to the local board of health, urging th taken to carry out the recommendations contained in the report.

WESTERN NEW YORK WATER CO.

ALBANY, N. Y., *February* 1

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany,*

DEAR SIR: — I beg to submit the following report upon an inv made at your order by the engineering division in the matter of supply furnished by the Western New York Water Company.

This matter was brought to the attention of this Department th communication received on January 17, 1912, from the secretary of the of health of the village of Kenmore, the latter being one of the supplied with water by the Western New York Water Company. The contained a request that an inspection be made by this Department

works of the water company to ascertain if any unusual conditions had arisen whereby the water supply had been or was being polluted. Reference was made to a report of the State Hygienic Laboratory, dated December 14, 1911, which indicated that the water at Kenmore showed some evidence of pollution at that time.

I detailed one of the assistant engineers, Mr. A. O. True, to make a brief investigation of the local conditions under which this water supply is obtained and distributed to the consumers.

The assistant engineer visited Buffalo on January 23 and 24, 1912, obtained an interview with Mr. G. W. Annis, secretary of the Kenmore board of health, and Mr. John T. Mooney, general superintendent of the Western New York Water Company, made an inspection of various parts of the waterworks system, and collected a series of samples of water from different parts of the distributing works.

The water supply of the Western New York Water Company is obtained from Lake Erie at a point somewhat over a mile off the eastern shore of the lake at Woodlawn Beach, a settlement in the town of Hamburg 2⅓ miles south of the southern boundary of the city of Buffalo. At this place is located the initial pumping station a few feet from the lake. The water enters the system through 2 intakes located in about 30 feet of water. One is a 30-inch, the other a 20-inch pipe, both lying in the bed of the lake. These two pipes join at some distance from the shore and from this point there is a 30-inch pipe laid to the intake well under the northwest part of the pumping station.

From the pumping station the water is pumped during 12 hours a day by means of electric power into large mains connected directly with the distributing system and leading to an open reservoir located about 4½ miles east of the main pumping station at the lake, and in the town of East Hamburg.

About 11 miles northeast of the lake pumping station and in the village of Depew there is another reservoir and nearby a second pumping station. These are known as the Depew Pumping Station and Reservoir. At Depew the pumps supply water direct to the mains and are operated continuously. The East Hamburg reservoir has a capacity of about 10,000,000 gallons, while that at Depew has a capacity of 3,000,000 gallons.

The property of this company comprises a very extensive system of distributing mains serving a large territory on the north, east and south of the city of Buffalo. This system serves the city of Lackawanna, the villages of Lancaster, Depew, Sloan and Kenmore; the towns of West Seneca and Cheektowaga, and parts of the towns of Hamburg, Amherst, Tonawanda, Lancaster, East Hamburg and Alden. The total mileage of water mains belonging to the company is about 150 and the total population served by these mains is estimated at 40,000. The total daily average pumpage is said to be about 7,500,000 gallons.

In the following table are given the results of analyses of samples of water taken at different times and at different points of the waterworks of the Western New York Water Company. These analyses were made by the State Hygienic Laboratory and include those of the samples collected on January 24, 1912.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe **odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.**

Laboratory number	Municipality	County	Source	Date of collection	Physical				Chemical (Parts per Million)											Bacteriological			
							Odor		Solids			Nitrogen as —						Hardness			B. Coli Type (+ = present, — = absent)		
					Color	Turbidity	Cold	Hot	Total	Loss on ignition	Mineral residue	Free ammonia	Albuminoid ammonia	Nitrites	Nitrates	Oxygen consumed	Chlorine	Total	Alkalinity	Bacteria per c.c.	10 c.c.	1 c.c.	1-10 c.c.
B-6497	Kenmore	Erie	Tap on public supply	12/ 4/11	Trace	30	1 v.	1 v.	151	26	125	.028	.092	.003	0.16	1.10	6.87	100.0	98	220	.....	.....	.....
-4192 / -6913	Kenmore	Erie	Tap on public supply	1/24/12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30	—	—	—
-4619 / -2097	Depew	Erie	Tap on public supply	2/ 1/11	5	5	1 v.	1 v.	153	52	100	.008	.064	.003	0.10	2.00	7.00	97.1	95	500	+	—	—
-5033	Depew	Erie	Tap on public supply	4/14/11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	180	+	—	—
-5589 / -3474	Depew	Erie	Tap on public supply	7/14/11	15	1	1 v.	1 v.	157	38	119	.004	.064	.001	0.04	1.50	7.00	100.0	95	670	+	—	—
B-5916 / C-3701	Depew	Erie	Tap on public supply	9/30/11	5	Clear	1 v.	1 v.	146	25	121	.012	.064	.001	0.02	1.00	6.87	109.0	97	100	+	—	—
B-6229	Depew	Erie	Tap on public supply	11/ 1/11	10	35	1 v.	1 v.	139	17	122	.004	.062	.002	0.04	1.70	7.75	103.0	98	140	+	—	—
C-3965	Depew	Erie	Tap on public supply	12/ 9/11	5	18	1 v.	1 v.	147	23	124	.012	.110	.005	0.06	0.92	7.50	91.4	89	1,500	—	—	—
B-6567	Depew				.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	+	—	—
C-4257		Erie	Tap on public supply	1/21/12	[illegible]	[illegible]	1 v.	1 v.	158	60	98	.006	.052	.002	0.20	2.40	6.75	97.1	97	400	.....	+	—

B-6569 C-4255	Lancaster	Erie	Tap on public supply	12/9/11	5	20	1 v.	1 v.	166	20	146	.020	.088	.003	0.06	1.40	7.25	100.0	85	3,400	+	—	—
B-6915 C-4565	Woodlawn pumping station	......	Suction well	1/24/12	5	15	1 v.	1 v.	139	15	124	.056	.102	.001	0.10	1.10	7.75	100.0	97	90	+	—	—
B-6014	Lackawanna	Erie	Tap on public supply	1/24/12	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	70	+	+	—
B-4512 C-2504	Lackawanna	Erie	Tap on public supply	1/12/11	20	35	2 v.	2 v.	168	48	120	.020	.132	.004	0.20	2.45	7.60	97.1	95	3,700	......	+	—
25 B-4688 C-2751	Lackawanna	Erie	Tap on public supply	2/14/11	12	15	1 v.	2 v.	118	50	98	.008	.070	.002	0.10	2.80	7.00	97.1	97	300	......	+	—
B-5010 C-2997	Lackawanna	Erie	Tap on public supply	4/10/11	15	30	2 v.	2 v.	188	62	124	.008	.044	.001	0.16	3.00	5.75	88.6	81	650	+	—	—
B-5202 C-3174	Lackawanna	Erie	Tap on public supply	5/16/11	15	10	1 v.	1 v.	161	33	128	.008	.076	.001	0.08	2.30	7.75	98.8	91	*5,100	—	—	—
B-6615 C-4296	Lackawanna	Erie	Tap on public supply	12/13/11	10	7	1 v.	1 v.	140	6	134	.030	.036	Tr.	0.06	1.30	9.00	100.0	97	35	—	—	—

* Delayed in transit.

From these analyses it is seen that this wa
Lake Erie water. It is moderately hard, and
be expected in such a large body of water, is
100 parts per million of hardness. Its physical
siderable and sudden variations, as is seen from
and turbidity. The waters along the shores
Erie are subject to considerable agitation resu
which prevail during most of the year.

Owing to the relative shallowness of the lake
of the roiling from the bottom extends for a
shore. Such conditions account for the variabl
which may be drawn from points even a consid

The chemical analyses indicate that on an ave
supply as delivered to the consumers, contains
organic matters. On the whole the nitrogenou
cessive nor does the form in which the nitroge
is any considerable constant pollution reaching
ber of the results for free and albuminoid am
and are higher than the general mean values, w
erate amount of intermittent pollution.

The bacteriological results are also consistent
which the supply is derived. About 35 per cent.
number of bacteria of 100 or less. About 52 per
300 bacteria or less. Only 6, or 27 per cent., show
cessive numbers for a surface supply, and in three
to the laboratory was too great to enable a re
Taken as a whole the results for total counts are
from a count as low as 20 per c. c. to counts in
or more.

The chief significance of the results of the te
fecal organisms would seem to be the indication of
contamination of the water supply by sewage or s
intervals. Such pollution has apparently never
duration or intensity. Although no B. coli ty
isolated from as small samples as 1/10 c. c., this
peared in four of the analyses of as small samp
results would indicate that the sanitary qualit
questionable at the time of the collection of these

Summarizing these results briefly in the light
part of Lake Erie from which this supply is tak
indicate a water which is, during the greater part
physical character and moderately good sanitary
subject to sudden and significant physical and che
times may receive some pollution from the sewage
on the north and possibly to a very limited extent
under certain conditions of winds and currents,
vicinity of the intake. The prevailing winds are
of the United States Weather Bureau show that e
east winds occur some 25 per cent. of the time in

Coming now to the works for distributing the
my investigations lead me to believe that no unusu
present time which would affect the sanitary qual
under ordinary operating conditions any pollution
system. It is true that the mains of the water co
creeks draining thickly populated communities and
luted by sewage. These crossings are, however, ex
conditions, as in making repairs or draining the
under internal water pressure and therefore co
water from the outside. The analyses, which, as
samples from various and remote points of the dis

indicate that there is any variation of the quality of the water from the lake to the distant consumers.

I now beg to make the following conclusions:

1. That there are no indications that any contamination of this water supply occurs at the points of crossing of the mains and the various creeks in the vicinity.

2. That this water is, during the greater part of the year, of good physical quality and of fair sanitary quality.

3. That at more or less infrequent intervals and due to unusual conditions of wind and currents the supply is somewhat polluted for short periods by the sewage which is discharged directly or indirectly into the lake from nearby thickly populated sections.

4. That this water supply, with careful supervision, may be satisfactory and safe for some years to come, possibly without filtration, if a regular and watchful control is had by those operating the waterworks, and frequent and regular analyses be made by the operators in order to anticipate and meet any unusual condition which might affect the sanitary quality of the supply.

I therefore recommend:

1. That a copy of this report be transmitted to the Western New York Water Company and the board of health of the village of Kenmore.

2. That the water company or those in charge or interested in this public water supply have frequent and regular sanitary analyses made of the water supply from various parts of the waterworks in order that a continuous record be had of the sanitary quality of the water at all times and at all parts of the system with a view of protecting the consumers in the event of pollution arising from unusual conditions at the intake.

3. That a "sterilization" plant for the treatment of the whole supply with minute quantities of hypochlorites be maintained at the pumping station for immediate use and that it be so used under the direction of a competent operator at such times as there may be possibility for contamination of the lake water until such time as a more permanent plant be established for the purification by filtration or otherwise of the whole supply.

Respectfully submitted.
THEODORE HORTON,
Chief Engineer

Copies of this report were transmitted to the Western New York Water Company and to the board of health of Kenmore.

INVESTIGATION OF OUTBREAKS OF TYPHOID FEVER

INVESTIGATION OF OUTBREAKS OF TYPHOID FEVER

For the year 1912 the typhoid fever death rate for the entire State is approximately 11.8 per 100,000 population. This is the lowest death rate for this disease for the last 28 years, which is the period for which continuous yearly death statistics have been recorded. It is approximately 44 per cent. lower than the average typhoid fever death rate in the State for this 28-year period, and approximately 52 per cent. lower than the average rate prior to 1905, the date when the reorganization of the State Department of Health was completed. Since the typhoid fever rate is generally accepted as the best index of the sanitary condition of any community, this record must be accepted as a striking example of the practical results that it is possible to obtain in a comparatively few years through a campaign of education and activity carried on systematically with a trained and efficient organization.

As has been the practice in the past special care has been taken to make thorough and prompt investigations into conditions surrounding epidemics or the undue prevalence of this disease. Because typhoid is often traceable to physical conditions closely associated with public water supplies, milk supplies, or sewer systems, these investigations have as a rule been carried on by the Engineering Division. In each case prompt measures for suppression of the epidemic were taken during the investigation and where it seemed necessary letters of instruction or advice were transmitted to the local health authorities in advance of the completed reports indicating the steps to be taken to prevent a spread of the disease. In all cases complete reports have been prepared outlining the more permanent changes which should be made to prevent, as far as possible, a recurrence of an outbreak.

During 1912 this Division was called upo
breaks or the undue prevalence of typhoid fe
places:

Adirondack (Town of Horicon)	Nor
Greenwood Lake (Town of Warwick)	Paw
	Rhi
Highland (Town of Lloyd)	Sava
Hoosick (Town of Hoosick)	Wasl
Middletown	

ADIRONDACK (Town of Horico

An undue prevalence of typhoid fever in the
dack having been reported to this Departmen
Barton, a citizen thereof, an inspection was mad
ber 3, 1912, the following letter was addressed to
to the local board of health:

ALBANY, N. Y., D

MR. SMITH BARTON, *Adirondack, Warren Co., N. Y.:*

DEAR SIR: — In further reference to the prevalence of typ
rondack concerning which you wrote this Department on
on October 21, I beg to state that I have since had a rep
Department visit the town of Horicon and examine into
typhoid fever and the conditions surrounding the cases.

It appears from the memorandum of the inspector's visit
been three cases of typhoid in the village and one case of fev
tion which is believed to have been typhoid. Careful inquir
cerning the conditions surrounding each case and it is evide
case to occur was probably contracted out of town and it is
able that the succeeding cases were what is known as contact
from the first case.

It is evident from the results of the investigation that prope
exercised by the local authorities to disinfect the discharges fr
and to prevent a further spread of the disease.

With reference to the question as to whether the stream wl
the Pump premises and through the premises of Mr. Porter is
barely possible that during the onset of the fever some pol
stream might have been possible but it is not likely that the
infected, or that, considering the fact that the stream is not u
supply purposes, any danger to the other residents of the village

I appreciate your interest in the matter of precautions to
tional cases of typhoid fever in the village, but do not believe t
conditions as existing, further trouble need be anticipated.

Very respectfully,
EUGENE H. POI
Con

CORNING

ALBANY, N. Y., *May* 14, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of my investigation of the recent typhoid fever outbreak in the city of Corning.

Upon the receipt of a telegram from the health officer, Dr. Frank S. Swain, received on May 3, 1912, advising the Department of the occurrence of over sixty cases of typhoid fever in the city and that the situation was considered alarming, you directed me to proceed at once to Corning to investigate the situation. Arriving there that evening at about 11 o'clock, I conferred at once with the mayor, health officer, bacteriologist of the county laboratory and representatives of the water board, and reviewed briefly the situation, securing what information I could from these gentlemen in regard to the outbreak and the possible causes. On the following day I made a thorough investigation of the records of the board of health concerning the cases which have occurred and which had been reported, made a thorough inspection of the public well and the records of the pumping station, had certain water levels taken in the well and of the back water from the lake with respect to water supply; and inquired specifically in regard to conditions of the milk supply; reviewed other data and secured all information possible which had any bearing upon the situation.

From my knowledge of the condition of the water supply gained from previous investigations by the Department of the conditions surrounding the supply and a careful but hasty study of the essential facts and information in connection with the conditions surrounding the water supply just prior to the present outbreak, it became quickly evident to me that the cause of the outbreak was an infection of the water supply. It has been shown during previous years from frequent analyses that the water in the well becomes polluted at times and I have previously reported upon the probable causes of this fluctuation in quality. I have also pointed out in my previous reports to you that the water supply was so contaminated at times as to be a serious menace to health, that it was impracticable to control any purifying process by hypochloride of lime through bacteriological analyses; and particularly pointed out the danger of an infection should hypochloride be used under conditions which would make it impracticable to determine the infection until it was too late.

The warnings of the Department on previous occasions seem to have been realized in this particular case, for it appears that on March 30 and April 1, 1912, high water occurred in the river which affected the conditions at the well in such a manner as to infect the supply. Although careful studies and levels were taken to determine accurately whether the infection was due to back water from the river or whether it was due to a natural rise in the ground water table, it was not possible to determine positively which influence was the primary cause. It happened that the gate at the dyke was, through carelessness or accident, left open and the water backed into the lake below the pumping station and into the small overflowing stream from the well to an elevation which was approximately at the height of the overflowed pipes from the well. While this back water was taking place, the records in the pumping station show that the water in the well also rose some two or three feet, at least to an elevation some foot and a half above the high water mark from the said lake. It is very probable and the records seem to indicate that the water in the well rose more rapidly than the back water from the lake and it would, therefore, seem strongly probable that the back water from the lake did not get into the well, but, on the contrary, there was a positive flow from the well outward during this high water period.

In my opinion it is due largely if not wholly to a contamination from ground water sources that the infection took place although it is quite probable that this ground water infection may have been partly caused by the back water from the lake, this back water filtering into the well possibly and entering it this way instead of entering it directly through the overflow pipes.

It is unimportant as to which of these influences was r
important fact remains that the well was at this time seri
and infected and that, as was anticipated and reported u
would be difficult to ascertain this contamination until it
explain more fully, bacteriological analyses are made dai
of the well water. Samples were collected on the Saturda
the day on which the water began to rise. It was Mond
the results of the analyses were observed and during this i
became infected. The results of the analyses, as observe
for a few days following, as shown by the accompanying ta
conclusive evidence of a very serious contamination and u
That it was an infection seems to be beyond question in vie
in about two weeks the first case of typhoid fever, of the
occurred and within the following two weeks some fifty or
had occurred. In other words, there is a perfect sequence
fection, period of incubation and outbreak of epidemic whic
unique chain of evidence in regard to the cause of the present
evidence was strengthened when consideration of other factor
ally responsible for typhoid fever was taken into account,
of the milk supply, in connection with which it was found that
five cases taken at random some sixteen or eighteen milk
volved and not more than three cases were on any one rout
showing quite clearly that the milk was not an appreciable f

Having reached a definite opinion concerning the cause o
and appreciating the seriousness of the situation I called a
of the various administrative departments of the city durin
and discussed with them fully the results of my investigatio
to the various boards specific directions which should be fo
order that the epidemic might be quickly suppressed. These d
given somewhat fully and specifically and a copy of them is
forms a part of this report. For a further protection of th
means of suppressing the epidemic I gave to the press your gen
instructions and warning to the taxpayers and residents of t
letter containing specific directions and precautions to be foll
every one in the city with reference to boiling the water, care of
gation of cases of typhoid fever, use of disinfectants and oth
matters. A copy of this letter which you directed me to prepare
and forms a part of this report.

At the joint meeting referred to above I endeavored to poin
various city officials the seriousness of the situation and it is
that each one of them felt the responsibility that was imposed
under existing conditions. At this meeting resolutions were pass
ing the health officer, Dr. Frank S. Swain, to proceed at once
out consideration of expense, to carry out the recommendations of
ment with respect to furnishing disinfectants, securing hospital q
the employment of nurses if necessary, the sending out of not
physicians of the city, the supplying of a special inspector for da
tion, etc. It was also understood at this meeting that other re
tions referring to other departments of administration would be t
once by those departments in order that the recommendations affe
could also be carried out without delay.

At your request I again visited Corning the following week
and conferred with the health officer in regard to the progress that
made in handling the situation. Aside from the inactivity of
department in cleaning out and sterilizing the reservoir which it wa
out by me the previous week might possibly be still contaminated, an
was found during the week to be actually contaminated, I learne
practically all of the recommendations were being carried out by the
board and other administrative departments of the city. Furtherm
appeared that only two or three new cases had developed, although as
be expected some two or three deaths had occurred; that is, many
large number of cases which have occurred in this city had not
passed the critical or dangerous period in the course of the disease.

Although there is evidence that the epidemic is now subsiding and notwithstanding the numerous precautions that are being taken in regard to preventing the spread of the cases, there will undoubtedly occur some residual cases although I feel somewhat assured that for the present at least the situation is under control.

Aside from the importance of this epidemic the situation from a scientific standpoint is one of unusual interest since I know of no epidemic on record where the chain of evidence is so clearly substantiated and where the scientific confirmatory evidence has at the same time been furnished as in this case. In fact the sequence of events that has led up to the epidemic, the warnings that have been given by the Department of the possibility of such an outbreak, the actual occurrence of this outbreak and the evidence as to the nature and source of infection present a picture which is both striking and instructive, one which may well be pointed out to any community where there may be signs of carelessness or neglect of so vital a factor of public health as the protection of a public water supply.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

NEW YORK STATE DEPARTMENT OF HEALTH,

ALBANY, *May* 6, 1912.

EUGENE H. PORTER, M. D., *Commissioner:*

Copy of memoranda left by Mr. Horton at the joint meeting of the various boards of administration of Corning on evening of May 4, 1912, covering instructions to the various boards as to measures to be carried out at once for the purpose of removing causes of infection and preventing spread of the epidemic of typhoid fever.

A. *For the Board of Health:*

(1) Send out notices to all doctors as to serious situation and call attention to certain precautions and instructions with reference to
  (a) Care of patients.
  (b) Disinfection of stools and urine.
  (c) Disinfection of clothing, cooking utensils and linen, etc.
  (d) Isolation of patients.
  (e) Instruct and oversee conduct of nurses.
  (f) Report promptly all cases.
  (g) Use disinfection freely and obtain from Board of Health.
  (h) Fumigate as in other diseases the rooms in which patients were kept.
  (i) Have cases generally, especially suspected ones, tested with widals.

(2) Important for board of health to supply disinfectants to doctors and people and instruct them how to use same.

(3)) Inspection of dairies and notices to them as follows:
  (a) Sterilize bottles and cans.
  (b) Clean up stables and premises.
  (c) Notify health officer of any suspicious illness.
  (d) Leave no bottles at homes where there are typhoid patients.
  (e) Notify all that any violations may result in closing of route.

(4) Provide hospital accommodations for all cases you can induce to go there. Rent place and engage nurses if necessary.

(5) Board of health to inspect every case, to verify reports, conditions, and give instructions.

(6) Last but not least authorize your health officer to proceed without encumbrance or thought of expense as his judgment may dictate in carrying out all the above: (1) hospital accommodations; nurses; disinfection; milk inspection; in fact all other measures which in his judgment are necessary. Do not temporize with the situation.

A. *Water Department:*

(1) Apply hypo more effectually and put in new a and a more scientific mode and procedure foi Have separate mixing tank and two hypo solut

(2) Empty reservoir and partially fill with clean rated water. Then wet again and fill full.

(3) Then flush out all dead ends of distribution syste substantially sterilize with clean hypo-water.

(4) Fix overflow at basin (i. e., overflow chamber) s again can occur; this can be done preferably by

(5) Arrange to so control gate at dike so no backv cause is possible.

C. *County Laboratory:*

(1) More care in details of collection of samples.

(2) Collect samples at reservoir and from system wei termine any residual pollution (take before pum morning).

D. *Mayor and Council:*

(1) Get an expert at once to study all possible new sou supply to furnish an ample supply of pure w ing at least following possibilities:

(a) Wells above city.

(b) Filtered Chemung river.

(c) Nearest gravity supply.

(d) Possibility of filtering present supply or pu means.

Ma

Warning to Taxpayers and Residents by State Commissioner of cerning Typhoid Fever

To the Taxpayers and Residents of Corning:

You have already been notified that there has recently been a pronounced increase in the amount of typhoid fever within the unless certain very necessary precautions stated below are taken every resident in the city there is a strong possibility that a demic may result.

At the request of your health officer, Dr. Frank S. Swain, an in of the cause of this sudden increase of typhoid fever is now being by experts of the State Department of Health; and although it is sible to say at this time that there may not be other contributing seems very clear that the primary inciting cause is an infection of water supply. There is little reason to doubt, also, that the ma wells through the city are also contributing causes.

It is of the utmost importance, therefore, that the spread of the be checked as promptly and effectually as possible and before a epidemic gains a foothold. This can only be done with the ready an co-operation on the part of the public with the active endeavors of and local departments of health, and to do this the following instruc hereby given to each and every resident of the city.

1. All water used for drinking or cooking purposes must first b for a period of at least fifteen minutes. This WARNING app only to the PUBLIC WATER SUPPLY but also to PRIVATE throughout the city, which in many cases may also have been with typhoid fever.

2. Every case, or suspected case of typhoid fever must be isol one room or sent to hospital and kept entirely apart from the res family. The sick room should be entered only by the nurse or pe charge of the patient.

3. Every case of illness, whether suspicious of typhoid fever must be promptly reported to your family physician or the healt

in order that it may be properly diagnosed and specific instructions given in care and isolation of patient in case the illness is found to be typhoid fever.

4. The strictest cleanliness *must* be observed not only in and around the sick room but by everyone in the household and throughout the home. This is of utmost importance with the nurse or anyone in charge of a typhoid patient. Every person in the household should carefully see that their hands are washed thoroughly before all meals.

5. Owing to extreme danger of catching typhoid fever by contact, that is, from one person to another, and since the germ usually enters the system only through the mouth, it is of greatest importance that the feeding and care of patient be kept apart from the feeding of the rest of the family. It is best to have separate dishes for patient, separate linen, separate means for disinfecting and washing them; in other words, have the patient and the nurse, or person live as separately apart from the rest of the family as is possible. For detailed instructions the family physician or health officer should be consulted.

6. Every precaution must be taken in the care of the patient in regard to use of disinfectants. All stools and urine must be thoroughly disinfected; all bedding, clothing, table linen, etc., disinfected; all cooking utensils and dishes should be allowed to stand in boiling water for one-half hour or disinfected. If you have not ample supply of disinfectants, apply to the health officer who will promptly furnish them and give you or your physician instructions how to use them.

7. The care of milk, and milk utensils, in every household is of the greatest importance. Germs grow and multiply readily in milk and for this reason typhoid fever is readily spread if the milk becomes infected. Therefore, keep all milk bottles away from sick room and thus prevent infection being carried back to infect the milk of an entire route. This will protect others. The safest plan for those who drink milk is to pasteurize or sterilize all milk used by bringing it to a boil (but not boiling it) and then allowing to cool; this will probably destroy all germs that may be present.

8. If your home is not connected with the sewer be sure to see that all stools are not only disinfected but carefully buried under at least one foot of soil and as far away as possible from any well.

9. See that all windows and doors (especially in sick room) are thoroughly screened; also privy. Flies are one of the most common and dangerous means of spreading typhoid fever. They carry germs from the sick room or a privy directly to and deposit them upon food wherever the opportunity is provided. Therefore keep them out of house, especially out of sick room, and out of the privy by thorough screening.

10. For further details of these instructions or for additional instructions call upon the health officer, who will gladly give them.

While it is not the intention in any way to cause undue alarm at this time, I feel it my duty as State Health Commissioner, and in the interest of the public health of the city, to point out clearly, if not by warning, that the present situation is a serious one and that unless prompt, aggressive and effective action is taken by the community and each and every resident in it to carry out the instructions given above, and unless each resident assumes that responsibility which during a time like this is imposed upon him best as a duty to himself and then to the community, there is the greatest possibility that a serious epidemic may follow.

Grave responsibilities in this important matter therefore rest at this time not only with the civic authorities but with the *individual*, and I trust that this appeal, made in the face of the serious conditions which now confront you, will result in a prompt and concerted action which will eradicate typhoid fever from your midst. I have no doubt whatever that this can be readily accomplished and I leave it to the public spirit and intelligence of the people of the city to see that these simple but important instructions given above are conscientiously and effectively carried out.

(Signed) EUGENE H. PORTER,
Commissioner of Health, State of New York

GREENWOOD LAKE (Town of

ALBANY, N. Y

EUGENE H. PORTER, M.D., *State Commissioner of Hea*

DEAR SIR: — I beg to submit the following repor typhoid fever at Greenwood Lake in the town of W The inspection was made on August 31, 1912, by C. engineer.

Greenwood lake is about 6.9 miles long and about 0. in a mountainous region on the boundary line betwee Jersey, about one-half of the lake being in each Stat cupied with summer hotels, where a large number of entertained for varying lengths of time. At the nor village, containing a store and other business enterp cream parlor, etc., which cater to the summer trade. obtained almost entirely from one dairy, located nea Large amounts of ice are cut from the lake and not o tons are shipped to New York city.

It will be readily understood that the investigation typhoid fever under such conditions with a view to defini of such an outbreak presents unusual difficulties. The ally varies with the result that in order to prove that cases were contracted at the lake it must be shown that oculated with the disease before they came there. The attended by physicians summoned from a distance, who i their patients and fail to report the cases. Obviously the must be introduced from outside and when the conditio are such as to facilitate the spread of such infection, a health authorities is necessary looking toward the remedyi tions. A careful investigation was, therefore, made of t tions at the lake in connection with the investigation of the

The cases of typhoid which are known to have occurred in near the lake may be tabulated as follows:

Daughters of L. S. Wright. Twelve and 14 years old. Th side privy about 35 feet from a well from which the drink tained. Milk obtained from Wm. Hunt and Edward Poston. away. The well is about 50 feet deep and is stoned up. F tending physician on August 15.

Abraham and Helen Hunter. Outside privies evidently u about 30 feet from an arm of the lake. An open cesspool is this place. Date of onset August 18. The father had been il with jaundice, liver and heart complaints.

C. H. Ten Eyck. Proprietor of Ten Eyck Inn. Recent repor ner states that he was sick with rheumatic fever probably in spring. May have been typhoid. Conditions surrounding the and are described later.

Son of William Carter. Home in New York city. Age 6 ye onset August 15. Use well water, the sanitary conditions of w good. On Lewis property at Montenac Foundation. Well in y feet from cesspool, claimed was sick when came.

It is probable that these are only a few of the cases which h at Greenwood Lake and it is locally rumored that as many as fr cases either in New York State or in New Jersey have already oc one death. Since this is a matter that will decidedly hurt a co this kind if it becomes generally known, the tendency is to hush u remove them as quickly as possible. Therefore, the above data can be absolutely relied upon. Rumor has possibly exaggerated t of cases. It must be remembered that the investigation did not in part of the lake lying in New Jersey over which this Department risdiction.

Maplewood Inn. E. W. Jones, Prop. One large cess from lake. Lake receives sewage from two flush closets lake, drinking water from well. Premises in good condi

Greenwood Lake Hotel. Outside privy in good cond from well 200 feet from privy.

Mountainside Hotel. Capt. Jacob Ryerson, Prop. In side privy cleaned frequently.

Willow Point Hotel. W. C. McGraw, Prop. Inside cl side for servants. Use spring water but pump from lake

Montenac House. Cesspool about 40 feet from lake, prob Water from springs but well was used part of the time. from lake for kitchen use, etc. Well on Lewis property in from cesspool. Now closed up but had pump and cup pre

Ferncliffe House. Have a septic tank and pump liquid from which tile drains to give surface irrigation. Fro of this basin it appears not to be effective.

Warwick Woodlands. Mr. Page, Prop. Cesspool about kitchen slops drain into lake.

Besides these cases a number of privies belonging to priv noticed which were close to the lake.

From the above tabulation it appears that there is ampl overflow from cesspools, for wastes from privies and kitch their way into the lake.

In view of the facts and conditions briefly described in th my opinion:

1. That the occurrence of some six authenticated c within the period of several weeks may be said to have undue prevalence of this disease and to call for vigorous by the local board of health.
2. That the facts brought out by this investigation wo that this outbreak is traceable to infection of the milk
3. That it is not probable that the origin of a majori can be said to have been due to a contamination of the and well water supplies, although the near proximity of privies to several of the wells is suspicious.
4. That neither shell fish nor flies are the probable cau break.
5. That the most significant circumstances in connection and spread of the disease are the decidedly insanitary condi at Greenwood Lake and the pollution of the lake itself.

In view of these conclusions I beg to submit the following tions:

1. That strict isolation be maintained in all cases and tha tions be taken in the care of patients suffering with the dis suspicious cases with respect to isolation, disinfection, etc., any spread of the disease.
2. That the milk supplies and dairies of the lake be unde scrutiny of the town board of health to prevent any possible the supply from present cases or any secondary infection b containers used by the present cases.
3. That all water taken from the lake be boiled even wh washing and general purposes until such time as it is certa dangerous pollution is removed from the water. And that at the lake be warned that its use for drinking purposes is d
4. That all closets having vaults or permanent containers of any kind be abandoned and removed in all cases where flush installed and that the immediate installation of the latter mended in all cases.
5. That where recommendation (4) cannot possibly be foll the privies be removed at least 100 feet from the lake or any provided with tight vaults protected by fly screens. The use o of lime as a disinfectant is recommended.

6. That settling or septic tanks be installed to receive all sewage to be followed by some method of subsurface irrigation or other filtration.

7. That no stable for cattle, horses, barnyard, hogpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile nor compost heap be located, placed, maintained or allowed to remain with its nearest point less than 100 feet from the lake or its branches.

8. That all garbage be disposed of by burial, burning or removal in a sanitary manner.

9. That the proprietors of the different hotels be impressed with the fact that the maintenance of strict sanitary conditions is imperative.

It is believed by this Department that the local hotel proprietors will realize that an outbreak such as has occurred at Greenwood Lake has been a great disadvantage to the locality and that only the most stringent steps toward improved sanitation will prevent a recurrence of typhoid fever at the lake in the future.

In conclusion I beg to recommend that a copy of this report be transmitted to the board of health of the town of Warwick and that they be advised to at once take action to follow out the recommendations contained herein.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

A copy of this report was inclosed in a letter addressed to the local board of health, urging that the action recommended be taken.

HIGHLAND (Town of Lloyd)

ALBANY, N. Y., *September* 19, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon an outbreak of typhoid fever at Highland, in the town of Lloyd, Ulster county. The inspection was made on August 28, and continued on September 4 and 5 by C. A. Howland, inspecting engineer.

Highland is an unincorporated village lying upon the bluffs of the Hudson river opposite the city of Poughkeepsie. The population is 2,000. Since it was thought by some of the residents that the water supply might be the cause of the epidemic, this was thoroughly examined. The system, installed in 1893 at a cost of about $39,000, consists of about four miles of pipe which distributes the water from three reservoirs on the mountain west of the village. It is an unfiltered gravity system. Near the top of the mountain is located a small dam across a depression in what is known as Black Ash swamp. A pipe and strainer lead the water which collects above the dam into the first of a series of three reservoirs. Springs and the runoff from the mountain supply these reservoirs. They are connected with each other, aeration between the first and second being effected by a short flow over rocks and between the second and third by two sprays controlled by float valves. These reservoirs all contain considerable algae and other filamentous aquatic growths. The water is fairly clear. The third is the distributing reservoir near which stands the valve house and from which leads the village supply pipe.

The land surrounding the reservoirs is owned by the water company. It consists entirely of woods, the nearest houses being those in the village about one mile below. As far as could be determined, no case of typhoid fever did exist or is likely to have existed on the watershed above the reservoirs.

Near the western end of the village a stream has been dammed up, forming a pond of considerable size from which the principal ice supply of the village is cut. An examination of the stream above showed pollution by privies, barnyards, etc., to a considerable extent. This pond is connected with the public water supply and has been used when the reservoirs on the mountain

became low. As far as could be determined this pond
summer. The water company has a contract with the
Railroad Company to supply the railroad engines w
The station agent alleged that the railroad had not
the last two months at least. When the pond is used
elevation than the reservoirs that the latter must be
drain into the pond. This reduces the pressure in the v
that this reduced pressure had not been noticed this

The milk supply of the village is obtained almost
Chase. The Schantz farm also furnishes milk to a
which milk is sometimes retailed but in small quanti
The Chase dairy was inspected and it was also learned
been previously inspected about the first of June by
New York city board of health. No case of sickness o
found to have existed here. The bottles for the milk s
water, soda and borax soap and dried in racks.

Mr. Chase has no herd of his own, so the milk is brou
from three farmers, Neilson, Schafer and Meiser. The
the Chase dairy and rinsed at the farms before the milk
The inspector drove to each one but could find no prese
sickness of any kind.

At the Neilson farm the wash water is taken from a w
the barnyard. At the Schafer farm the cans are rinsed w
well not near any privy and at the Meiser farm with wel
feet from the privy.

The cases of typhoid fever may be tabulated as follows:

Palmer.— Eleven years old, lives 1½ miles outside of
been away from home. Use own well. Tenants are butter
one day fever. Mild case with no delirium. Use own m
Italian berry pickers from the city had typhoid fever at
the present case and is still sick. This family resides on wa
into the pond above referred to.

Stellowac.— About 8 years old, lives outside of village. D
water supply. Milk supply not known, probably goat. *Itali*

Anna Terpenning.— Girl 17 years old, lives in village and u
water and Chase's milk. Was picking currants at a house wl
typhoid of unknown origin occurred last year. Drank water
case; just recovering.

Baker.— Man about 25 years old. Works at grape juice
on bank of creek which serves village but probably did not dr
water.

Frank Bond.— Use public water in house but drink *wel*
Chase's milk. Had not been away. Sick three weeks. Mild
use any ice.

Mrs. Mackey.— Uses well water. Not near any privy. No
supply. Mrs. Martin in same house had malarial fever prev
Martin uses well water and Chase's milk.

Hendricks.— Superintendent of water works. Has *drunk* v
Uses condensed milk. Has not been away.

Nearly all of the above cases where ice is taken use *that cu*
pond above the village. The above cases all occurred between th
in July and the 20th of August.

An examination of the above cases fails to show any *common*
which the cause of the epidemic as a whole may be attributed.
use Chase's milk but an investigation of this supply failed to
reason to believe it a cause. There is a possibility that *the h*
containers, such as milk bottles, may have spread the disease, bu
are carefully washed the possibility is remote.

Several of the cases can easily be attributed to contact with
cases which were introduced from outside. There is no doubt

HOOSICK (Town of Hoo

ALBANY, N.

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to submit the following report occurrence of typhoid fever in the Tibbits' School loc: village of Hoosick in the county of Rensselaer and of the city of Troy.

On December 3, 1912, a letter was received fro: health officer of the town of Hoosick, informing yo cases of typhoid fever in Tibbits' school, and stati by the Rev. E. D. Tibbits, rector of the school, for t authorities in determining the source of the disea: tion seem to be of local origin. The request was al: officer for analyses of the water and milk supplies

This matter being referred to me, I deemed it a be immediately made of local conditions at the schoo water supply be collected for analyses at the State this purpose Mr. A. O. True, Assistant Engineer, w lage of Hoosick on the morning of December 4, 19

The assistant engineer went to Hoosick Falls a McGrath to the school at Hoosick, four miles sou at the office of Dr. I. C. Whitehead, physician to t the Rev. E. D. Tibbits, rector of the school, and local conditions, the number of cases and probat school, and their previous history.

There were apparently two cases existing in t spection and one suspicious case who had been u ature about December 2, 1912.

Case I. Francis Lukens, school boy, age 13, ho been home or away from school or vicinity since of onset not definitely known but probably about 1912. Water supply and milk supply same as us raw shell fish, and raw vegetables eaten came fro used by all at school. Widal test made Noven Mild case.

Case 2. Hugh Parrich, school boy, age 14, h been home since September 25, 1912, and had not Hoosick. Had been ailing with cough, etc., for Pennsylvania. Said to have had typhoid fever be nitely known but probably about same time as t the 10th to the 20th of November, 1912. Water as in case No. 1. Widal test made December 1, 1

Case 3. (Suspicious case.) Carl Gates, sch ture about Dec. 2, 1912. Widal negative.

There were no cases of typhoid fever in the v time of inspection and it could not be learned t of this disease in the surrounding country or i

In the afternoon an inspection was made of rounding the school buildings and the sources o samples of the water supply were collected for a Laboratory.

The main school buildings are located north c lage street in the western part of the village an Maine Railroad. The water supply for lavato a deep driven well located near the rear of th tected by a small building containing the pum a steam engine for driving the pumps. The wat tank under the roof of one of the school building by piping to each building. There are no sewe of pollution near the well, and there has been i water is not safe and potable. The reason adv

for drinking and culinary purposes is that oil from the well pump occasionally finds its way into the water imparting an objectionable taste.

The drinking water is at the present time brought to the school in milk cans from the Brant farm, located west of the railroad and about a quarter mile southwest of the school buildings. This farm also supplies the school with milk. An inspection was made of the farm buildings and the conditions surrounding the water and milk supply.

The water is pumped from a driven well into an elevated wooden tank by means of a windmill. The well is said to have been made by driving an iron pipe about one inch in diameter. It is located some 10 feet from the northwest corner of the farm house and some 40 or 50 feet south of the highway. There are no direct sources of pollution near the well. The water raised by the wind mill is stored in a covered wooden tank beside the barn some 200 feet south of the well. The water is drawn from this tank through a pipe leading to a yard hydrant near the well.

There has been no sickness among those on the farm, and it could not be learned that the proprietor or his helper had been exposed to any possible infection. The milk for the school is obtained from some 12 cows, which are kept in the lower part of the barn. This enclosure and the general surroundings of the buildings were in reasonably good sanitary condition.

The sewage from the school buildings is conducted in an outfall sewer to an outlet on a small tributary of the Hoosick river at a point about ⅜ of a mile north of the school.

The results of the analyses of samples of water collected from the two sources of water supply are given below:

REPORT OF WATER ANALYSIS FOR TOWN OF HOOSICK (TIBBITS' SCHOOL)

Laboratory number	B-9293 C-6450	B-9294	B-9295
Source	Well Brant farm	Well Brant farm	Tap from school well
Collected on	12/4/12	12/4/12	12/4/12
Color	Trace	....	....
Turbidity	Clear	....	....
Odor, cold	1 v.	....	....
Odor, hot	1 v.	....	....
Solids, total	151	....	....
Loss on ignition	20	....	....
Mineral residue	131	....	....
Ammonia, free	.010	....	....
Ammonia, albuminoid	.014	....	....
Nitrites	Trace	....	....
Nitrates	0.60	....	....
Oxygen consumed	0.80	....	....
Chlorine	4.50	....	....
Hardness, total	120	....	....
Alkalinity	110	....	....
Bacteria per c.c.	30	30	160
B. coli type	10 c.c. 0+3− 1 c.c. 0+3 0.1 c.c. 0+3—	10 c.c. 0+3— 1 c.c. 0+3— 0.1 c.c. 0+3—	10 c.c. 1+2— 1 c.c. 0+3 − 0.1 c.c. 0+3 −

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

The water in the well on the Brant farm was of satisfactory quality at the time of the collection of the sample. The sample was clear and practically colorless though hard. The moderate total bacterial count and the absence of fecal organisms indicated the probable absence of any recent pollution of the well, but the high chlorine and the somewhat high free ammonia for a ground water indicates the effect on the water of organic wastes from the men and animals occupying the watershed of the ground water from which the well is fed.

The bacterial count of the sample from the scl that of the Brant well, is not excessive. Fecal o were found in one of the 1 c. c volumes of wat important sanitary significance.

In closing I would submit the following conclu

1. That there have been two cases of typhoi of some 50 boys in a hamlet totaling some the maximum prevalence of typhoid fever.

2. That the intensity of the typhoid repre would not indicate an outbreak of the diseas more than the average occurrence of this district of the State at this season of the y

3. That the absence of any insanitary cor stances in this locality and further since tl plies, which have been common to the whol in good condition, it appears that the pres gin, and the existence of any local source o

4. That the water and milk supplies sh most careful inspection of the school autho alyses should be made of the water supply. by the State Hygienic Laboratory but sho chemist at a private laboratory.

5. That extreme care should be taken in the attention in the sick room but in th discharges and their disposition by burying that care be taken both by the school phys guard against secondary infection at the t carriers.

At the present date no new cases have been and with the proper care, and with the recover likelihood of further spread of this disease wi

Respectfully

Copies of this report were inclosed in lette of health and to the Rev. E. D. Tibbits, rector

MIDDLETOV

ALB

EUGENE H. PORTER, M.D., *State Commissione*

DEAR SIR: — I beg to submit the followin recent visit to Middletown in connection w fever in the city and with special reference t to one of the dairies supplying milk to the ci

My visit was made on October 8 and 9, du J. L. Hanmer, health officer, and members of with him the statistics of the occurrence of t year and previous years, with especial refer also visited and inspected this dairy and or nishes a part of the milk supplied to the cit

The essential facts with reference to typ some 30 cases of typhoid fever have occurre year, all but one of which has occurred s Dr. Hanmer stated that some 10 or 11 are and of the remainder approximately one-half used milk from the Waygunt dairy. Dr. H

termined at this time, nor until further investigatio health with reference to the existing patient at the typhoid carrier have been carried out, the local bo once exercise the strictest supervision over this dair any evidence as a factor in the occurrence of typhoi this and in order that certain doubtful facts may recommend:

1. That the diagnosis and blood tests of the p be completed in order to confirm or preclude thi cause.

2. That continued efforts be made to locate cently left town and that Widal tests be mad whether he is a bacillus carrier.

3. That they require the owner of this farm steam chests for sterilization of the bottles be made to see that these facilities are pr efficiently sterilize all bottles and cans used at

4. That the board require very strict compli strongly enjoin in the present case the propr leaving any bottles of milk or other container of typhoid fever exist.

I believe that the situation with reference to typhoid fever in connection with this dairy is of the board of health and I feel assured that if now being carried on by the board of health an are completed and the improvements at the dairy a fever which now occurs along this dairy route will

Respectfully submit

TH

A copy of this report was inclosed in a letter a of health urging that the steps recommended th

NORTHPORT

Following an inspection by a representative of tions affecting the undue prevalence of typhoid i letter was addressed to the local board of health. also inclosed in a letter addressed to the Thursday

ALBANY,

DR. JOHN P. HEYEN, *Health Officer, Northport, N.*

DEAR SIR: — Following an investigation of t Northport made by Principal Assistant Enginee Department on August 20 I have thought it a cerning the recent prevalence of typhoid fever i somewhat the conditions existing in the village.

In response to your request of August 7 I det Gibson of Huntington to visit Northport and to the prevalence of typhoid fever in your village.

On August 9 Dr. Gibson reported to me that h you going over the ground and that he had reac typhoid outbreak in the village was due to mil

As you are aware the conditions which mig typhoid in the village were carefully gone over. Mr. Cleveland of this Department, and it was f was in satisfactory condition, there being no prob taking place either at the wells or at the reserv by the results of the analyses which you exhibit

It should be noted that under the Village Law portions of the permanent general sewer system ne and in this way at a minimum of cost a beginni prehensive sewer system for the village may be mad all sewer construction will be along permanent lin

A copy of this letter is being transmitted to l retary of the Thursday Club of Northport, a req from this club on August 17 for a further investi of the typhoid fever conditions in Northport.

Assuring you that the assistance of this De rendered in every way possible in carrying out th recommended above, I am

Very r
EU

PAWLING

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following repo by the engineering division in the matter of the village of Pawling in connection with an inqu rence of several cases of typhoid fever in that

Pawling is an incorporated village in the sou county, and on the Harlem division of the Ne River railroad, 64 miles north of New York cit the divide between the watersheds of the Ten l the Croton river on the south. The present p about 850.

On February 1, 1912, a communication was from Dr. G. S. Pearce, health officer of the v the occurrence of typhoid fever in the village sentative be sent to make an inspection of l assistant engineers, Mr. A. O. True, who was th was detailed to visit Pawling at once to inquir of all suspicious cases in the locality and to were attributable to the public water supply o

The assistant engineer arrived in Pawling on 1912, and called on Dr. G. S. Pearce, the vill Pearce it was learned that there had been two village in the fall and winter of 1911, one the present year — a nurse who had left the v taken sick — and two cases in the latter part the statistical data of these cases.

1. Ralph Schmid, student at Pawling Boys S 15, 1911. Village water supply. Had eaten r Ten days before taken sick at Pawling, said home in Brooklyn. Oysters said to have be two weeks in summer.

2. Dr. F. D. Mitchell, health officer, town about December 6, 1911. Case fatal. Did Buffington well. Milk supply from Burr farn Dr. Mitchell lived in village but did mu around surrounding country. He was attende the former of Katonah and the latter of Paw

3. Miss Sharp — one of the nurses for case ary 13, 1912.

Miss Sharp engaged on another case of sick sick. Went to New York city and is reporte

Another important matter which came under the
ant engineer was the practice of ice cutting on th
had been carried on near the dam recently. Ther
carelessness in the harvesting of ice. Near the n
between the highway and the reservoir, horses, evid
hauling the ice, had been standing on ground tribu
not more than 18 feet from the water's edge. An
was spread over this ground and the snow was
which had drained from it, and also with urine fr

No insanitary conditions were found in the int
than a mile northeast of the reservoir, nor on the
above the intake. There are four or five houses
are well removed from the stream or its branches.
shed is about 1.7 square miles, and it receives so
three highways which traverse its length and br
be some moderate amount of pollution from the w
areas on this watershed.

The results in parts per million of analyses
water supply of the village of Pawling during
and February of the present year are given in
analyses were made by the State Hygienic Lab
collected by the assistant engineer on February 8,

These results indicate a moderately hard water.
matter contained in the water at the time of s
but were probably due in considerable measure to
The chlorine content is probably not much abov
the State. The total bacterial counts are in no c
source of water supply. In fact they are with
highest, and, of course, excepting the well sampl
face water. The results for the examinations for
isms are for the most part satisfactory, and wou
is only moderately affected by animal organic ma
analyses, however, indicate an undue amount of
organisms being found in as small a volume as 1
recent pollution by considerable animal organic n
of such organic matter is not always directly
always undesirable and, furthermore, indicates
whereby infected and dangerous material can t
supply in the event of the existence of a case
watershed.

The results of these analyses are consistent wi
watershed at the time of the inspection as discus

I beg to make the following conclusions and re

1. That there is no evidence to show that
which have recently occurred in Pawling ar
source of infection, and that they are prob

2. That in general satisfactory sanitary co
shed of the public water supply, but there
ties for extremely objectionable and pos
namely (a) the direct drainage into the rese
ture land and dressed fields, (b) the pra
reservoir.

3. That the conditions noted under (a)
fencing off the stream tributary to the reser
from entering and polluting the water, and
manure on the territory adjacent to the re
the polluted water from the watershed abov
adequate and suitable ditches in such a way
the water supply.

4. That the practice of ice cutting be either prohibited or carried on only under the strict supervision of the board of water commissioners and in such a way as to guard against any pollution of the water.

5. That frequent and regular inspections be made by the board of water commissioners of all sources of the public water supply in order to prevent any accidental or heedless pollution.

6. That should the board of water commissioners experience any difficulty in protecting the public water supply of the village they apply to this Department for the enactment of rules and regulations for the sanitary protection of the supply.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

REPORT OF WATER ANALYSES FOR VILLAGE OF PAWLING

Laboratory number	B-4734 C-2792	B-5131 C-3110	B-5446 C-3387	B-6900 C-3692	B-6268 C-4005	B-6801 C-4502
Source	Tap on public supply	Tap on public supply	Tap on public supply	Tap on public supply	Tap on public supply	Tap on public supply
Collected on	2/22/11	5/8/11	6/22/11	9/19/11	11/8/11	1/18/12
Color	Trace	....	5	5	Trace	5
Turbidity	Clear	Clear	Clear	Clear	Clear	Clear
Odor, cold	1 v.	1 v.	1 v.	1 v.	1 v.	1 v.
Odor, hot	1 v.	2 v.	1 v.	1 v.	1 v.	1 v.
Solids, total	106	85	116	99	93	97
Loss on ignition	20	19	30	8	12	15
Mineral residue	86	68	86	91	81	82
Ammonia, free	.030	.032	.014	.018	.004	.020
Ammonia, albuminoid	.074	.178	.056	.074	.086	.028
Nitrites	.005	.003	Trace	.001	.001	.001
Nitrates	0.16	Trace	Trace	.020	0.06	0.30
Oxygen consumed	1.50	1.10	2.50	2.90	1.91	1.00
Chlorine	2.50	2.00	2.25	2.00	2.00	2.00
Hardness, total	77.1	60	74.3	80	80	80
Alkalinity	76	58	63	74	72	73
Bacteria per c.c.	250	20	12	35	30	90
B coli type	10 c.c. — 1 c.c. — 1/10 c.c. —	10 c.c. + 1 c.c. — 1/10 c.c. —	10 c.c. — 1 c.c. — 1/10 c.c. —	10 c.c. + 1 c.c. — 1/10 c.c. —	10 c.c. — 1 c.c. — 1/10 c.c. —	10 c.c. .... 1 c.c. .... 1/10 c.c. ....

Results are expressed in parts per million. + Present. — Absent.

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

No.	CASE	Occupation	Date onset	Water supply	Milk supply	Raw vegetables	Shell fish	Location	Attending physician	Widal test
1.	Walter Lang	Schoolboy	Sept. 2–9	Village	Schultz	None	......	Central	Dr. Lown	Not nec.
2.	John Tater	Mason and violet grower	Sept. 18	Village	Day & Greenhouse	?	......	N. E.	Dr. Goodell	Not nec.
3.	Mrs. W. Tremper	Housewife	Sept. 11	Village	Greenhouse	?	......	N. E.	Dr. Goodell	....
4.	K. Maher	In greenhouse	Sept. 11	Village and well	Starr Miller	None	......	West	Dr. Dederick	Positive
5.	Helen Pottenberg	Schoolgirl	Sept. 6	Village and well	Schultz	None	......	North	Dr. Goodell	....
6.	Lizzie Rosenkrans	Temporary resident	Sept. 14	Village	Day & Schultz	None	......	S. C.	Dr. Goddell	....
7.	Henry DeBoiss	Teamster	Sept. 19	Village and well	None	None	......	Central	Dr. Dederick	Positive
8.	Richard Deyo	....	Sept. 21	Village	None	None	......	N. W.	Dr. Dederick	Positive
9.	Simon Deyo	Chauffeur	Sept. 21	Village	None	None	......	N. W.	Dr. Dederick	Positive
10.	Mrs. E. Shufelt	Housewife	Sept. 18	Village	Cookingham	None	......	S. C.	Dr. Dederick	....
11.	Leon Butler	Schoolboy	Sept. 26	Village	None	None	......	Central	Dr. Goodell	....
	Nora Stiles*	....	....	....	....	....	......	Central	Dr. Lown	....

* Suspicious case.

ground surface. The top is protected by a conica
are operated alternately or in rotation, in such a
allowed to remain out of service for any consider
dug well has been out of service since about Septe
Inquiry of the local manager and engineer of the
ful inspection in and around the wells and pumpi
any opportunity for direct contamination, of the w
Landsman kill or other surface sources. Complaint
appearance at certain times of great turbidity in t
the taps. This condition encouraged a popular su
was at times used to supplement the public water
was probably due to sediment in the mains from r
mulations from suspended mineral solids in the wat
from the mains by sudden changes of pressure as wo
the mains through the hydrants or an unusually la
of the main.

It is likely that there may be some leakage of cree
pit or even from the creek itself into the subsoil,
small amounts into the deep wells. Both the deep v
head from the ground water when the deep well p
Such leakage would have to pass through a considera
and underlying strata before it could find its way in
casing or leak into the well at the junction of the we
One end of the wheel-pit is about 15 feet from No. 3
to have a thick concrete floor. It was covered with wa
down by the 12-inch conduit, and could not be readil
of the floor as could be reached with a test bar was so
of a point at the southeast wall near one corner. I
opening filled with gravel through which extends an
known what this stem is for and the depth of water
inspection to ascertain its function. The stem could
there was no appreciable flow of water through the flo
The dug well is located at the foot of a steep hill ri
300 feet southeast of the pumping station. It is onl
ditch or drainage line leading out of a deep ravine —
of a wet weather stream of considerable proportions.
above this well and directly on the edge of this ravin
used by those occupying a nearby violet house. On the
the dug well and deep well No. 4, there is some cult
proaches within 75 feet of the dug well. Around the f
dug well No. 1 a strip of land has been plowed, appare
tion of manuring it.

An inspection was made of the lower part of the wat
kill, above the pumping station. But one instance of d
found in the overflow of a cesspool on premises about
mile above the pumping station. The watershed is ve
lated. It could not be learned that there were any case
on this part of the watershed.

The results of the analyses of samples of water colle
Hygienic Laboratory and by the assistant engineer are g
accompanying this report.

The physical character of the water of these samples is s
would indicate that there was seldom any appreciable co
supply, and that there was usually little or no turbidity.
however, that there have been no samples collected betwee
of May and the latter part of August, 1912, during which se
by some in the village that the water was occasionally
The water is always hard, averaging well over 100 parts
million.

None of the results would indicate that the water at a
excessive amounts of nitrogenous organic matters. The val
and oxygen consumed are somewhat variable and average con

The public water supply of the village is derived from wells, located on the left bank of Landsman kill, at a point one mile east of the village. There are two deep bored wells and one shallow dug well in use at the present time. From these wells the water is pumped in adjacent pumping stations into the main, connecting an equalizing and storage reservoir with the village. The reservoir is an open concrete basin, located on the top of a hill, about half a mile south of the wells.

The distributing system consists of about seven miles of water mains, ranging from 2½ inches to 8 inches in diameter. The average pressure in the village is about eighty-five pounds per square inch.

The water works were built in 1899 by the Rhinebeck Water Company, and are at present owned and operated by this company.

About 80 per cent. of the village is served by the public water supply. Large quantities of water are used in the violet houses, the raising of violets being an important local industry. The average consumption varies greatly and is estimated to fluctuate between 40,000 and 100,000 gallons per day. Some water is also supplied to the Central New England Railroad. There are about 350 service taps, none of which are metered.

Originally the works were equipped with only one source of power for pumping — namely an overshot water wheel installed in the large pumping station, located 25 feet south of Landsman kill, a mile east of the village. This equipment is said to have been inadequate from the first and had to be supplemented and later largely replaced by other prime movers. This water wheel is about 14 feet in diameter, revolving over a rectangular wheel-pit, which extends some 8 feet below ground level. The water supply for this wheel comes from a headworks on Landsman kill, about half a mile north-east of the pumping station. It is conveyed in a 12-inch cast-iron pipe line, terminating at the station in a 12-inch riser pipe, delivering the water to a small forebay from which it runs onto the wheel. The discharge from the wheel flows into the stream in a tail race. The wheel is chain connected to one of two triplex pumps in the pumping station. Recently this wheel has only been used at times of high stream flow. During the dry weather months the water from the 12-inch power line is by-passed into the tail race. This water in the tail race backs up into the wheel-pit where it remains several feet deep at the end nearest the stream and some 6 inches deep at the opposite end.

The main pumping station is of wood and two stories high. In addition to the water wheel it contains two triplex pumps and a gas engine. This engine can be belted to either of the triplex pumps and to a line shaft on the southeastern side of the building, which in turn may be belted to a deep well pump, located just outside the pumping station and some 14 feet from the wheel-pit of the overshot wheel. This line shaft can also be driven by a steam engine and boiler, located in a wooden building, a few feet southeast of the main station. The triplex pumps take their suction from a dug well, located some 175 feet southeast of the main station. About 40 or 50 feet east of the main station there is a second deep well called No. 4. Water from this well is raised by a deep well pump belt driven by a ten H. P. electric motor. This machinery is housed in a permanent brick building. Directly in the rear of the main pump station on the southeast side there is a dug well, which has not been used for some years.

The deep well next to the main pumping station, deep well No. 3, is said to have a capacity of 150 gallons per minute, and the other deep well, well No. 4, a capacity of 125 gallons per minute. Both of these wells are about 300 feet deep by 8 inches in diameter. In boring these wells a rock was encountered at from 15 feet to 20 feet below the surface and below that point the borings are largely in rock. Both wells are said to be cased several feet into the rock with 8-inch pipe casings. During pumping the water surface in well No. 3 is said to fall about 100 feet and that in No. 4 about 32 feet.

The only dug well now in use, well No. 1, is about 12 feet in diameter and 24 feet deep. The top of the masonry curb is about 2 feet above the

2. That all premises in the central part of t
kept in a sanitary condition, and that the bo
disinfection of all privies in this part of th
advise householders to keep the privy vaults
fected.

3. That all surface polluted waters be preven
draining down upon the immediate area of the p
by drainage ditches or similar means.

4. That the shallow well be abandoned as a
supply, and should the deep wells be inadequat
quantity of water that a new source of suppleme

5. That further investigation be made by th
the sanitary condition of the deep wells supplem
chemical and bacteriological tests of the water.

6. That the floors and walls of the wheel-pit
be put and maintained in a thoroughly water-tig

Respectfully submit

THEO

Copies of this report were inclosed in letters addres
of health and to the Rhinebeck Water Company.

SAVANNAH

ALBANY, N. Y.,

EUGENE H. PORTER, M.D., *State Commissioner of Health,*

DEAR SIR: — I beg to submit the following report of the Engineering Division of an epidemic of typhoid fe village of about 520 people in Wayne county.

An investigation of this epidemic was made by Dr. Deputy Commissioner of Health, on September 17, 1912. had been nine cases in the village and two suspicious appeared that the local milk supply was a very probable of this infection, in view of the possibility of it being thought desirable that a member of this division make a tion of local conditions.

On October 9, 1912, Mr. A. O. True, Assistant Enginee make this investigation. The assistant engineer arrive October 10, 1912, and spent the day and the following the occurrence of the cases and circumstances which appe way associated with the appearance and spread of the dise he was assisted by the village health officer, Dr. W. H. S

There were at the time of this last investigation 12 fever in the village and 2 cases outside of but near the vil together with information relative to the history of each table below:

From a study of these cases it will be seen that the outb intensity — 12 of the cases having occurred within a period 9 of the cases within one week and 7 of the cases within th cases have terminated fatally. There have been no new village since September 12, that is for over one month. T pearing early this month are located a short distance outsi limits of the village.

Below is given further details of history of some of the lated in the table.

No. 1. Operative in R., S. & E. power house in villa central part of village. Early in September consulted Dr. Sw trouble with lungs. Later consulted Dr. Pierce. Was taken to hospital at Syracuse about September 4, 1912, where fatally.

No. 2. Local merchant, had been ailing some time previ used town well water at store and water from house well fatal.

No. 4. Had helped milkman (Welsh) in the village dis about two weeks beginning middle of August. Second week gave up — had been in Weedsport some time in July. Early at Sunday School picnic at Owasco lake — also in Syracuse gust, for a day with father. Had ice cream there — had been but once when he went to get some apples.

No. 7. Not feeling well during summer — graduated in Ju high school — had been clerk in a local merchant's office (nc Had been feeling tired some time — spent a week in Butler visiting friends. Was at Owasco lake picnic in August, also August for a day or so. Was in Clyde on evening of Septemb which time went to play with others. Case No. 6 also went had ice cream while there.

No. 10. At N. Y. C. R. R. bridge at Seneca river during July where he was employed as carpenter on works in connection for new Barge canal. Gang there was supplied with milk from and water from town pump. At home has water from well ac was at Seneca Falls on September 9, was not well at that time.

No. 11. This case and case No. 12 live at Cartner farm one n village. No. 11 case has been working out at Clyde — came every other week.

ANALYTICAL DATA OF WATER SUPPLIES

Abbreviations used to describe odors of water: 0, none; 1, very faint; 2, faint; 3, distinct; 4, decided; 5, strong; 6, very strong; a, aromatic; d, disagreeable; e, earthy; f, fishy; g, grassy; m, musty; v, vegetable.

Laboratory number	Municipality	County	Source	Date of collection	Physical: Color	Physical: Turbidity	Odor: Cold	Odor: Hot	Solids: Total	Solids: Loss on ignition	Solids: Mineral residue	Nitrogen as—: Free ammonia	Nitrogen as—: Albuminoid ammonia	Nitrogen as—: Nitrites	Nitrogen as—: Nitrates	Oxygen consumed	Chlorine	Hardness: Total	Hardness: Alkalinity	Bacteria per c.c.	B. Coli Type (+ = present, — = absent): 10 c.c.	1 c.c.	$\frac{1}{10}$ c.c.
-	Rhinebeck	Dutchess	Tap, public supply	8/ 5/10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16,500	+	+	—
	Rhinebeck	Dutchess	Tap, public supply	8/ 5/10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6,500	+	+	—
B-1873 C-2891	Rhinebeck	Dutchess	Tap, public supply	3/20/11	5	Trace	1 v.	1 v.	175	37	138	.030	.052	.002	1.00	1.60	5.00	120.0	100	60	1+2—	—	—
B-5158 C-3130	Rhinebeck	Dutchess	Tap, public supply	5/11/11	10	Trace	1 v.	2 v.	178	19	159	.022	.028	.004	0.30	0.57	3.00	117.0	115	1,000	—	—	—
B-5470 C-3383	Rhinebeck	Dutchess	Tap, public supply	6/26/11	15	Clear	1 v.	1 v.	124	9	115	.012	.050	.001	0.10	3.00	1.75	81.4	74	2,200	3+0—	3+0—	0+3—
B-6065	Rhinebeck	Dutchess	Tap, pump head of well	10/12/11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	30	—	—	—
B-5818 C-3612	Rhinebeck	Dutchess	Fountain, public supply	9/ 7/11	15	5	1 a.	1 a.	207	20	187	.012	.088	.001	0.24	0.60	3.25	146.0	143	300	3+0—	2+1—	0+3—
B-6066	Rhinebeck	Dutchess	Tap, pump head of well	10/12/11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20	—	—	—
B-6067	Rhinebeck	Dutchess	Dug well	10/12/11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	30	3+0—	1+2—	0+3—
B-6104 C-3865	Rhinebeck	Dutchess	Fountain, public supply	10/18/11	10	Clear	1 v.	1 v.	138	22	116	.034	.122	.001	0.16	1.70	5.50	82.9	76	500	3+0—	1+2—	0+3—
B-6814 C-4472	Rhinebeck	Dutchess	Tap, public supply	1/ 5/12	Trace	Clear	1 v.	1 v.	193	20	173	.012	.020	Tr.	0.52	0.10	4.00	106.0	138	50	1+2—	—	—
B-7148 C-4762	Rhinebeck	Dutchess	Tap, public supply	2/19/12	5	Clear	1 v.	1 v.	141	10	131	.018	.038	Tr.	0.52	1.64	1.00	94.2	92	160	3+0—	0+3—	0+3—
B-7485	Rhinebeck	Dutchess	Tap, public supply	3/25/12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	40	3+0—	1+2—	0+3—
B-7904 C-5405	Rhinebeck	Dutchess	Tap, public supply	4/29/12	Trace	Clear	1 v.	1 v.	164	19	145	.002	.032	Tr.	1.08	0.70	3.50	129.0	101	30	1+2—	—	—
B-8410 C-5692	Rhinebeck	Dutchess	Tap, public supply	8/26/12	20	3	1 v.	1 v.	102	16	86	.008	.084	Tr.	0.08	2.80	1.62	81.4	79	15,500	3+0—	2+1—	0+3—
B-8721 C-5943	Rhinebeck	Dutchess	Fountain, public supply	10/ 2/12	5	Trace	1 v.	1 v.	311	27	184	.008	.030	.003	0.04	0.80	3.87	83.3	140	1,000	0+3—	0+3—	0+3—
B-8723	Rhinebeck	Dutchess	Deep well and No. 3, public supply	10/ 2/12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	140	2+1—	0+3—	0+3—
B-8720 C-5941	Rhinebeck	Dutchess	Dug well, public supply	10/ 2/12	5	Trace	1 v.	1 v.	255	41	214	.004	.022	.001	0.60	0.90	6.00	160.0	156	650	3+0—	3+0—	3+0—
B-8724 C-5943	Rhinebeck	Dutchess	Distributing reservoir	10/ 2/12	10	Trace	1 v.	1 v.	185	30	155	.006	.042	.003	0.04	1.80	2.50	111.0	111	1,400	0+3—	0+3—	0+3—
B-8722	Rhinebeck	Dutchess	Landsman kill at 12in. intake	10/ 2/12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	700	3+0—	1+2—	0+3—

The sanitary conditions in the residential portions the most part reasonably satisfactory considering tl system of sewers or water supply. The premises are houses well kept. Privy vaults are necessarily numer the best sanitary condition. Many places also have discharged on the ground where the wastes are c running onto adjacent premises and causing more o are almost universally located near the houses from 2 and the water from the majority is necessarily draw lying beneath a thickly populated area.

In the business portion of the village there are tions. There are several privy vaults apparently us persons which are in an insanitary condition. Sor been disinfected even during this serious epidemic should be taken by individuals, households and pu are also some rubbish heaps — containing papers soi and other substances which attract flies. It should very prevalent at the time of inspection. The surf village ultimately reach a drainage ditch which fo line about an eighth of a mile west of the main st into a branch of the Seneca river. By its appeara able organic wastes. It is unlikely that this drain nection with the present situation.

From a consideration of the data gathered from t time would not permit of an inquiry into all possib arrived at the following conclusions:

1. That typhoid fever appeared in the villag first of September with such number and conc constitute a serious epidemic.

2. That the sudden appearance of such an which has been reasonably free from excessive years past would indicate the great likelihood simultaneous infection or a common medium o

3. That the facts in the premises would seem ply, raw vegetables and raw shell fish as proba infection.

4. That in all probability the infection and s due to a temporary infection of the milk suppl tle or bottles with a typhoid carrier or typho quent use without sterilization. The milk supp except two which are detached from the epidem of onset, and milk supply. It is not clear at th cases are secondary to the epidemic or sporadi

5. That the lack of sewerage facilities necess engendering general insanitary conditions in t village, may be contributory causes in connect by flies or other means of contact.

6. That no new cases having occurred in th 13 last, a period of over a month, the primar passed and with the proper care of all pres isolation and thorough disinfection and a cl sources of secondary infection throughout th ondary cases will occur.

In conclusion I beg to submit the following rec

1. That strict measures be taken both by and the board of health in requiring proper is all existing cases.

2. That the sanitary conditions be improved ing milk to the village, and that no milk where cases of typhoid fever now exist. Th sterilization of all milk utensils at the dairy

3. That the board of health cause a thorough canvass to be made of the whole village, to ascertain any insanitary conditions, to order their immediate abatement and to order a frequent disinfection of all privy vaults.

4. That a campaign against flies be organized and that the typhoid fly be exterminated and the number of his breeding places lessened.

5. That extreme care and control be exercised in the shipment of milk to the local creamery. While it is improbable that butter would be infected through milk chance infection might occur through that or other channels and an unquestionably safe barrier should be maintained between the present cases and all milk used for any purpose — local or otherwise.

In conclusion I would say that if this situation is taken seriously in hand and individual and public action taken along the lines indicated in the above recommendations that this epidemic will be completely checked.

Respectfully submitted,

THEODORE HORTON,

Chief Engineer

A letter, inclosing a copy of this report, was addressed to the local board of health, urging that the recommendations in regard to the prevention and recurrence of typhoid be promptly carried out.

CASES OF TYPHOID FEVER OCCURRING IN SAVANNAH

No.	NAME	Occupation	Date of onset	Water supply	Milk supply	Location	Attending physician	Widal test
			1912					
1	L. V. Monroe	Local power-house	Aug. 29	Well at boarding-house	Welsh	Central	Dr. Pierce	No
2	Albert Reed	Merchant	Sept. 1	Town well; well at home	Welsh	Southeast	Dr. Sweeting	No
3	Mrs. W. H. Sweeting	Wife of H. O.	Aug. 28-31	Well at home	Welsh	Eastern	Dr. Sweeting	+
4	H. Whitlock	School boy	Sept. 1	Well at home	Welsh	Central	Dr. Sweeting	No
5	C. Field	School boy	Sept. 3	Well at home	Welsh	Western	Dr. Sweeting	.....
6	Emma Judson	School girl	Sept. 5	.....	Welsh	Southeast	Dr. Sweeting	+
7	Laura Wells	Clerk	Sept. 8	Well in house	Welsh	Eastern	Dr. Sweeting	+
8	John Jones	Tinner	Sept. 1	.....	Welsh	Northern	Dr. Allen	.....
9	Mrs. Whitbeck	Housewife	Sept. 12	Well				

WASHINGTONVILLE

ALBANY, N. Y., *August* 29, 1912.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report as follows on an investigation into conditions surrounding the prevalence of typhoid fever in the village of Washingtonville, Orange county, made on August 16, 1912.

The investigation was made in response to a request from Dr. George S. Bond, health officer of the village, in a letter dated August 14, in which he stated that there had been three cases of typhoid fever officially reported to the local health authorities.

The village of Washingtonville, which has a population of 700, is located in the central part of Orange county, about 7½ miles southwest of Newburgh. Moodna creek, a tributary of the Hudson river near Cornwall, passes through the village.

The village water works, which are under the control of the trustees, were installed in 1895 and are fully described in a report dated November 29, 1909, and printed in the annual report of this Department for 1909.

The supply is taken from a tributary of Moodna creek at a point about two miles southeast of the village.

There are no public sewers in the village, although there are several private sewers and party sewers, one serving residents on North street and discharging into a drainage ditch which crosses Main street and is covered during the greater portion of its flow to Moodna creek. Another sewer serves the public library and is used by one or two private houses. This sewer discharges on the surface of the ground at the bank of Moodna creek in the rear of premises owned by John T. Brooks. Typhoid fever has not been prevalent in the village during former years.

An inspection of the watershed was made during the investigation in company with Dr. Wm. E. Reed, health officer of the town of Blooming Grove. It was found that conditions on the watershed were substantially as reported following an inspection by a representative of this Department in 1908. At the time of this inspection there were but three places on the watershed which might contribute pollution to the supply. Since then the conditions at one point, the property a few hundred feet above the reservoir, have been remedied, but the privy at the Davitt place, occupied by Peter Heterson and referred to in the former report as the Benjamin place, is still located on the bank of the intermittent stream. However, owing to weather conditions, no pollution from this privy has in all probability reached the reservoir during the past two months since the drainage passing the site of the privy must fill a depression and overflow the public highway before passing into the stream tributary to the reservoir. It was evident that this has not occurred recently. This privy should be at once removed to a distance of at least 100 feet from the drainage course and placed in proper sanitary condition. At the Gregory place the manure pile is still located within 50 feet of the stream, but Mr. Gregory stated that he had sold his cow and that the manure pile would soon be removed.

The results of analyses of the samples from the public supply of Washingtonville collected in 1908 showed comparatively little pollution either from animal or human sources. Analyses of two sets of samples each year were made in 1911 and 1912 and these analyses showed the water to be not in satisfactory sanitary condition when three of the four samples were taken. The comparatively high bacterial count, amounting to as high as 18,000 bacteria per c.c. in one instance, may have been due to surface wash from barnyards and highways, but, on the other hand, following heavy rains the privy on the Davitt place above referred to may have caused the unsatisfactory condition of the water as shown by analyses since this farm is near the reservoir and the drainage ditch or intermittent stream leading to the creek is very steep and would quickly carry pollution to the reservoir.

The results of the analyses of the sample o on the village supply on August 16, receive Laboratory on August 28, while indicating tl sanitary condition than when three of the fo collected in 1911 and 1912, still shows that so ply either from barnyard washings or other so count was 550 per c.c. and bacteria of the B 1 c.c. volume of water.

It was possible during the inspection to obt tive to three cases of typhoid fever which have August 1 and general information in regard In each case the family was supplied with vil that, owing to the tastes and odors, the vill cooking and in each case private wells are us in common by the patients except in one case have drank from the Jaques well, from which cured for bacteriological analysis. This well v used by a visitor to the village who was typhoid.

The immediate sanitary conditions surroun fairly good except in the case of the well at all three wells are sunk in a gravel substratum age ditches occur within 200 feet. The Dusenbu loose stone wall built under the kitchen floor well is located the cesspool, outside the house,

During the past year a furnace cellar has be and owing to the gravelly nature of the soil nace cellar some 8 or 10 feet from the well may the waters in the well. A sample of water fr bacteriological analysis. The water used by on the well on the E. R. Emerson premises and well was taken for bacteriological analysis. T curred between July 26 and August 4, and th developed since that time.

The milk supply was obtained by two of t occurred wholly from the Borden Condensed M located in the village, and the third case used meat market supplied from the farm of John regular supply from the Borden plant. The co were inspected and found to be sanitary.

The Borden Company is furnished milk by 39 inquiry at the bottling plant was made as farms.

It was stated that a weekly report is recei workers on each farm and of the sanitary cond while two instances of previous illness from which occurred from two to six years ago had of blood specimens from these two helpers had physician with negative results in each case. mond Dusenbury, one of the residents of the worked at the Borden plant up to the time of sisted partly of office work and partly of assist All the milk bottled at the Borden plant i shipped.

Considerable importance attaches to the fact cal features of the village are flat and that th gravel stratum in which the wells are sunk. T general use of cesspools in the village and the p sewer ditches this condition has a direct bearing typhoid fever recently prevalent in the village.

On July 4 a dance was held at the public library which was attended by two of the persons who later became ill with typhoid. The toilet in the public library discharges into the sewer which leads through the premises of John T. Brooks and discharges on the bank of Moodna creek at the rear of his property about 75 feet from the kitchen.

Little connection could be established between the cases as to their being caused by contact. Mr. Brooks conducts an ice cream and confectionery store, but the water is supplied from a well which is evidently not subject to contamination. The Thompson boy had been on trips to Newburgh, Goshen and other places during the early part of July, and one of the other patients had been out of town, or rather had come to Washingtonville from Middletown.

The results of the bacteriological analyses of samples of water from the Jaques, Dusenbury and Emerson wells confirm the indications presented by the surroundings of these wells that they are subject to pollution. Although without further and more complete analyses of these well waters confirmatory of such pollution, it would not be reasonable to finally condemn the use of these well supplies for potable purposes, it may be stated that the total bacteria count ranged from 50 to 2,000 per c. c. and that in all three analyses bacteria of the B. coli type were found in 1 c. c. volumes of water. It is apparent that water from these wells and from all other wells in the village similarly situated in a gravel substratum in which cesspools are present at nearby points should not be used for potable purposes without being boiled unless subsequent and more complete analyses procured by the owners of the wells show that these well waters are safe for human consumption. And under the existing circumstances and in view of the dangerous situation of these wells with respect to cesspools and sewage ditches in the gravelly soil in which they are sunk it is not probable that further analysis will show them to be safe sources of water supply under the conditions now existing.

It appears from the facts obtained during the investigation that no positive cause for the prevalence of typhoid fever in Washingtonville can be definitely assigned but there are two conditions which may very likely have been responsible for the outbreak.

The two general conditions in the village which should be corrected at an early date and which may have been responsible for the prevalence of typhoid consist of the discharge of sewage into open ditches and on the bank of Moodna creek, and in the use of individual wells dug in a gravelly substratum in districts in which cesspools form the method of sewage disposal.

It is evident that the village will continue to be subject to possible outbreaks of typhoid fever unless the general sanitary conditions are improved and the greatest need at present consists in the construction of a modern system of sewerage and sewage disposal for the village.

The village trustees should be urged through the local board of health to arrange for the preparation of plans for sewerage and the submission of such plans to this Department for approval. Following the approval of the plans it is possible under the provisions of the Village Law to construct only the more necessary portions of the sewer system and considering the compact nature of the village and the comparatively short lines of sewers which would be necessary to construct in order to relieve the present insanitary conditions of the thickly built up portions of the village, the cost of the few lines of sewers necessary to attain this result would not be prohibitive. Furthermore, the bond issue to furnish the means for constructing such portions of the permanent general sewer system may be made payable at some considerable time in the future and with these arrangements made a comparatively light burden would be placed on the taxpayers of the village when the improvement is undertaken and the first portions of a sewer system along comprehensive lines would be constructed which would be of great sanitary benefit to the village residents.

I would recommend that a copy of this report be submitted to the board of health of the village of Washingtonville and that they be advised to con-

tinue the precautions which were being taken at to prevent a spread of typhoid fever in the villag urged to consider the recommendation contained the sanitary conditions on the watershed and to system of sewerage for the village.

Respectfully subm

Pri

A copy of this report was inclosed in a letter of health urging that the recommmendations reg ditions on the watershed of the public supply ar conditions be carried out.

INVESTIGATION OF COMPLAINTS RELATING TO STREAM POLLUTION

INVESTIGATION OF COMPLAINTS RELATING TO STREAM POLLUTION

The question of stream pollution is, broadly speaking, closely associated with questions of water supply and sewage disposal. Either an improvement or a laxity in connection with any one of them involves a corresponding improvement or retrogression with the others. The laws governing the jurisdiction of the Department are however different in each case, and for this reason a differentiation must be made as to their classification, especially with respect to what may be appropriately included under sewage disposal and what under stream pollution.

Attention has already been called to the provisions of the Public Health Law and the work of the Engineering Division with respect to the disposal of sewage of municipalities and industrial establishments, especially in connection with the examination and approval of plans and the issuance of permits for the discharge of sewage from sewerage systems of these corporate bodies. There are many cases of pollution of streams, however, that do not arise from sewage discharged from new municipal or industrial sewer systems but which either on account of the specific exemption under the Public Health Law, or because the source is from private sewage discharge, must be dealt with differently and under different provisions of the Public Health Law.

These cases constitute a large class with a wide range in their relative importance. Many of them are difficult to deal with on account of important interests involved, questions of riparian rights, or inadequacy of local ordinances. The policy of the Department in dealing with such cases is to have an investigation made, usually involving a local inspection on the ground from which a report embodying findings and recommendations can be prepared and furnished the local board of health and interested parties to guide them in properly correcting and abating the conditions.

Space will permit of a reference only t
cases of stream pollution in the State w
reports were made by the Engineering Divis
suitable action was taken by the State D
health boards in their abatement, as follows

ALBANY

ALBANY, N

EUGENE H. PORTER, M.D., *State Commissioner of He*

DEAR SIR: — I beg to submit the following report o
plant of the Municipal Gas Co. at Albany, N. Y., wh
direction by Mr. C. A. Holmquist, assistant enginee
accompanied by Mr. Frank S. Dunn, superintendent o
15, 1912.

This inspection showed that practically no change
method of caring for the wastes from the gas plant
last inspection.

The cellar drain, however, which formerly flowed th
the company where it picked up and carried with it
been intercepted, and the drainage discharged into a
with the recommendations of the report on the inspectio
March 7, 1908.

The wastes from the plant, containing tar and oil, a
rectangular settling tank, provided with baffles, whic
secondary cylindrical settling tank also provided with
from the latter tank which also receives considerable c
charges through a baffled outlet into a tributary of
sewer, which empties into the Hudson river, about one-
gas plant. The tar which settles to the bottom of the
into large tank cars and sold by the company.

Dry scrubbers are used at the plant and the water fo
returned from the settling tank so that the amount of wa
plant would probably be reduced to a minimum if the co
not discharged into the secondary settling tank. The su
that this water would be intercepted and diverted into
system as soon as the frost was sufficiently out of the gr
making the necessary changes.

It appeared from the inspection that the character of
probably be improved by treating only such wastes as co
by increasing the settling capacity of the treatment wor
modeling the baffles and the outset from the secondary se
give more efficient baffling and thereby prevent as far as
from escaping to the sewers.

Although some oil was seen escaping through the outlet
settling tank no oil was noticed coming out of the outlet se
Over a considerable area below the mouth of the sewer, h
ticed small beads of oil rising to the surface of the river
the ice where they spread out and form irridescent films.
into this portion of the river liberated these beads of oil in
which would indicate that oily or tarry wastes, presumably
of the Albany Municipal Gas Co., had been discharged into t
the Patroon's creek sewer, and deposited on the bottom of th
outlet, inasmuch as no beads of oil rise to the surface w
thrown into the river above the outlet of the sewer. The ice
let was also discolored and had an oily appearance.

In conclusion I would state that the character of the wastes discharged into the Hudson river from the Albany Municipal Gas Company's plant would, in all probability, be improved by treating only such wastes as contain oil or tar, by remodeling the baffles and outlet of the secondary settling tank and by installing additional settling tanks. In order to still further improve the effluent from the settling tanks it would probably be necessary to resort to filtration.

I would, therefore, recommend that a copy of this report be sent to the Gas Company and that they be advised to follow out the recommendations embodied in this report.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

A copy of this report was sent to the Municipal Gas Company of Albany and a letter was received dated May 11, 1912, stating that the company had taken steps to follow out the recommendations made in the report.

COHOES

ALBANY, N. Y., *April* 22, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an inspection of the Cohoes Gas Light Co.'s plant at Cohoes, N. Y., made at your direction on March 13, 1912.

This inspection was made by Mr. C. A. Holmquist, assistant engineer of this Department, in company with Mr. Parsons, manager of the Cohoes Gas Light Co., and showed that considerable improvement had been made in caring for the wastes of the plant since the inspections made during the year 1908 and in the early part of 1909.

Wet scrubbers are still used at the plant and the waste from these scrubbers, together with the waste overflow water from the seal boxes and the tarry wastes of condensation from the tubular condensers, amounting in all to about 15,000 gallons per day, are discharged into a concrete settling tank about 60 feet square, which has been described in previous reports and memoranda. This tank has a capacity of some 108,000 gallons and provides for an average time of detention of about seven days when the tank is clean.

The baffles and outlets of the tank have recently been so modified as to prevent in a large measure the discharge of tar and oil into the river. The outlets from the tank formerly consisted of:

1. An overflow chamber provided with an overflow pipe whose elevation was adjustable and so arranged that the lighter oils could be drawn off from the surface of the tank and conveyed by gravity flow to a pump well, located beneath the purifying room and from which these oils were formerly pumped into a cylindrical steel tank where they were separated from the water and used again in making gas.

2. A large cast-iron pipe, located near the bottom of the tank and provided with a gate valve, which was previously used for the purpose of draining the oil tank.

It was evident from former inspections that the heavier tarry wastes were periodically discharged into the river through this pipe and that portions of the river below the plant were occasionally covered with a yellowish scum, which gave off characteristic pungent odors.

The adjustable overflow has been abandoned and an elbow provided with a 4-inch riser pipe has been attached to the large cast-iron outlet pipe. This riser pipe extends to a height of 4 feet above the bottom of the tank

and is surrounded by a water-tight bottomless wood
about one foot above and about the same distance bel
tank, thereby acting as a baffle in preventing both
from escaping through the outlet into the river. No
tering this overflow pipe at the time of the inspect
however, covered the outlet end of the pipe so that
note the effect on the river, if any, of the overflow f
Some light oil was seen rising to the surface of the
head, but its origin could not be determined, inasmu
from the plant were submerged.

The tar which accumulates in the bottom of the ta
statement of the manager, is pumped into the eleva
which was formerly used entirely for separating the
the tar also is now separated from the water and use
burned over the coal fire under the boiler of the plant a
spection. The water which separates from the tar and
forms a layer between these substances is discharged int
settling tank located in the ground near the separato
water which probably contains some oil and tar should
the large settling tank and not into the small settling tan
vided with baffles and which overflows into the river. A
amount of light oil is also discharged into the river with
from the gas holders.

The manager of the plant stated that the overflow p
holders are to be connected with the large settling tank i
any oil from escaping into the river from these sources.
from the plant containing oil or tar should be passed thr
tling tank referred to above before it is discharged into th

The amount of wastes from the plant could be greatly r
stitution of dry scrubbers for wet scrubbers and by the in
turn water system by means of which the water from the
be returned to the seal boxes. The capacity of the settlin
be increased by installing a longer overflow riser pipe at
tank.

In conclusion I would state that although the amount
caping into the river from the Cohoes Gas Co.'s plant wa
than on previous inspections, which would indicate that th
settling tank has been greatly increased by modifying the ba
lets of the tank, it would appear that the character of the
all probability be improved by reducing, as far as possible
the wastes produced at the plant which is governed largely b
water used in the operation of the plant and by treating all w
tar or oil before they are discharged into the river. In order
improve the character of the wastes it would probably be ne
the settling tank effluent.

I would therefore recommend that a copy of this report
Cohoes Gas Light Co. and that the company be advised to t
from the plant containing oil or tar in the settling tank be
charged into the river and that the amount of wastes produce
be reduced as far as possible in accordance with the recomm
bodied in this report.

Respectfully submitted,

THEODORE HO

Chie

A letter, enclosing a copy of this report, was sent to the Coho
Company, urging that steps be taken to eliminate the pollutio
hawk river by wastes from this plant.

DELMAR (Town of Bethlehem)

ALBANY, N. Y., *October* 11, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an inspection made on October 2, 1912, in regard to an alleged nuisance caused by the pollution by sanitary sewage of a brook in Delmar, an unincorporated village in the town of Bethlehem, Albany county. The inspection is made by C. A. Howland, Sanitary Inspector.

The brook evidently drained a part of the village originally, but as building advanced, the land has been filled in and a tile pipe laid to take care of the water. This drain extends from a point just above the intersection of Adams place and Kenwood street to a point just below Delaware avenue. Above the drain the stream appears to have been an open ditch which has grown up with weeds and been partially filled in. Below Delaware avenue the brook flows in a shallow ravine along the side of Terrace place to the Delaware and Hudson railroad tracks, under which it passes.

At the railroad culvert the stream was clear; flowing in a steady stream about 0.5 feet wide and 0.2 feet deep. No odor was noticeable at this joint. Above the culvert about 100 feet the stream shows evidences of pollution. A black scum becomes noticeable on the slack water and the characteristic odor of decomposing house sewage becomes apparent. The bed of the stream is grown up with rushes and other vegetation obstructing and retarding the flow. The surface of the deposit in the bed of the stream is brown but when stirred up it shows as thick black muck or sludge. The roots of the plants were covered with the deposits from the water. These deposits judged by their color and odor were evidently feces. An offensive odor could be noticed near the stream at the time of the inspection but it was not apparent at any distance away. The soil of the vicinity is sandy with some clay but none could be found having the same appearance as the stream bed, which would indicate that this distinctive appearance is due to deposits from the water. A drain tile emptied into the brook. This comes from the house of Mr. King. Mrs. Becker also informed the inspector that a drain carries the kitchen wastes from her house into the stream. The Kunz privy is about 75 feet from the edge of the ravine but as the pollution of the brook is apparent above these points it appears that these are not the whole cause of the pollution in the stream.

Two inlets discharge into the drain just above Delaware avenue. One of these was opened and the same odor of house sewage could be noticed. The drain of 10-inch tile passes through the block above Delaware avenue. Near the center of this block the tile enters a catch basin built with loose rock walls and open bottom. Five drains were counted emptying into this basin. Paper was noticed on the bottom and the brown, slimy appearance indicated deposits of feces. The inlet and outlet drains are near the bottom, so that but little sewage stands in the basin. The soil is sandy and porous and probably absorbs some of the liquid. By inquiry of residents the inspector learned that the catch basin had been in use for about five years and the tile drain from ten to fifteen years. Further inquiry indicated that other houses are connected with the drain both above and below this catch basin but this could not be determined absolutely in the time at the disposal of the inspector.

From the above inspection it appears that the tile drain sewers a portion of the village of Delmar, receiving the sanitary sewage of a number of houses. The discharge of the effluent from this drain into an open ravine under the conditions given above with the resulting odors and unsightly appearance constitute a nuisance as defined under the Public Health Law. Steps should immediately be taken by the board of health of the town of Bethlehem toward the permanent removal of the causes of this nuisance. This can only be accomplished by the discontinuing of all discharge of sanitary sewage or household wastes into this drain and open ravine. The ravine should be cleaned out and maintained in a sanitary condition.

The village of Delmar is provided with a public v
result many of the houses are fitted with modern plur
closets. Some method of removing the sewage from
dently an absolute necessity and, therefore, the drai
been utilized, resulting in conditions insanitary an
nuisances. Such methods can only be temporary and
must be remedied at considerable expense. I would t
upon the local board of health that they take steps to
as provided in the Town Law and have plans prepare
system of sewerage to be submitted to this Departme
installation of such a system of sewers in the immed
which present conditions in the village make imperati

I would therefore suggest that a copy of this repo
the board of health of the town of Bethlehem with the
take up with the people of the village the recommendati
relative to the establishment of a sewer district unde
Article 11 of the Town Law and that the board take
eliminate all discharge of house sewage and wastes into
described above.

Respectfully submitted,
THEODOR

On October 15 letters enclosing copies of this report wer
local board of health and to the complainant urging that
provided by the Town Law to establish a public sewer sy
Mr. W. A. Glenn, attorney for the town board, conferred
gineer on October 18, and later Mr. Horton delivered a lect
ing of the Delmar Improvement Association held to conside
sewerage for the village.

JEFFERSON

ALBANY, N. Y., *Septem*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Alb*

DEAR SIR: — I beg to submit the following report on an i
the alleged pollution of a stream by creamery wastes in the
village of Jefferson, in the town of Jefferson, Schoharie count
tion was made on September 7, 1912, by C. A. Howland, ins
pany with Mr. Robert Mann, of Jefferson.

A branch of Middle brook flows parallel to the main street
This has been dammed at the western end forming a small pon
the principal ice supply of the village is cut. As far as could
the stream at this point or below is not used for a water sup

Two creameries discharge their wastes into this stream. Evi
lution by such wastes for a considerable length of time were not
to and in the pond. The first creamery above the pond is rent
ated by Mr. J. H. Gilmore. About 6,000 lbs. or about 700 gal
are received at this creamery per day. Butter is made but no ch
the liquid wastes go into a tile drain which discharges direct
stream. Below this point the stream is from 1½ to 2½ feet wide
velocity and not deep. The discoloration of the stream is very
a decided odor is noticeable when the creamery is operating.
alleged that he had received authorization from the owners of t
install a septic tank and was about to make application to this
for permission to discharge the effluent into the stream.

The second creamery, of which Mr. Ross is manager, receives about 3,000 lbs. or about 350 gallons of milk per day. Clot cheese and some butter are manufactured. The farmers take the whey, clot cheese and buttermilk. Floor washings go into a tile drain discharging into an open ditch leading into the stream. A septic tank is provided to receive all other wastes. At the time of the inspection the tank was not operating and an examination revealed that a length of the drain from the creamery was broken near the tank and the discharges flowing into the open ditch and stream. The drain was clogged beyond the break and the tank itself appeared in need of cleaning. These matters were called to the attention of Mr. Rose and he immediately took steps toward putting the plant in working order. It appears, however, that no permit has ever been issued by this Department allowing the discharge of effluent from this tank. Such an application is now in the hands of the local health board and it is expected will be forwarded with the application from the other creamery.

The stream in question flows several hundred feet from the house on the principal street of the village and many of these use cesspools. The cesspools appear in every case to be removed a sufficient distance away to allow a considerable purification in the soil before any overflow would reach the stream. No privies were observed near the stream.

From the above inspection it appears that the stream is undoubtedly greatly polluted by the wastes from these creameries and conditions produced which are conducive to nuisances. The proprietors and local health board are, however, actively engaged in remedying these conditions.

I would recommend, therefore, that Mr. Rose be advised to put the septic tank at the Rose creamery in good working order and maintain it in that condition, that screens be maintained over the catch basins in order to prevent refuse such as rags, sticks, etc., from finding their way into the drain and that application be immediately made to this Department for permission to discharge the effluent from this tank into the stream. Further in regard to the creamery operated by Mr. Gilmore, I would recommend that a septic tank be installed, designed after the suggestions contained in a letter addressed to Dr. C. H. Topping, the local health officer, under date of August 3, 1912, and that application be immediately made to this Department for permission to discharge the effluent from such tank into the stream. The above suggestion regarding screens should be followed in this case.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

Copies of this report were sent to the local board of health and to the complainant and applications were subsequently received from the creameries requesting permits allowing the discharge of wastes into the stream after treatment. These permits were granted on September 27.

POTSDAM

ALBANY, N. Y., *January* 15, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an investigation into the matter of complaints of nuisances caused by the discharge of sewage from the village sewer system into the Raquette river at Potsdam.

This matter came to the attention of this Department through a petition recently received from some sixteen people residing in Potsdam along the east bank of the Raquette river, and requesting that an examination be made by you of the conditions which are the subject of these complaints. I detailed Mr. A. O. True, Assistant Engineer, to visit Potsdam, make an inspection of the locality in question and determine the cause and extent of the nuisances existing there. This inspection was made on November 20 and 21, 1911. At the same time many of the residents living in the locality and nearest the

river were questioned by the assistant engineer as to
any nuisance caused by the sewage discharge. All
summer and some of the loss of the use of the river
poses.

The sanitary sewage from the village of Potsdam
treatment into the Raquette river through some five ou
of the river in the northwestern part of the village. Tl
sewage is discharged through one main outlet sewer in
other outlet sewers drain Washington street. Walnut
and Cherry street respectively, which are below and
street. The first sewers are said to have been built in
years ago and new sewers and extensions have been bui
as the increase in population demanded. The sewer or
the outlet from it has just been completed last fall.

The territory included by the above named streets nea
begins at a point about ¾ of a mile below the dam and e
equal distance northerly between the eastern bank of the
road tracks. There are some 20 houses having the rear c
the river bank along the territory in question, and loca
feet from the water's edge. Opposite and near this par
there are several long narrow islands lying parallel to th
ing the flow of the river. Those nearest the river bank a
only about 100 feet. During low stages of the river the fl
is said to be relatively small and the water very shallow
inspection there appeared to be a considerable volume of w
nel but a small velocity of flow.

The main outlet sewer at Elderkin street is 18 inches
lower end being of cast-iron and protected for a distance
from the shore by a dock of rock and earth filling. Orig
discharged at or near the end of this dock, but complaints
made and the outlet has been extended within two years by
two lengths of 18-inch cast-iron pipe. The other outlets exte
into the river and are protected by riprap piers or docks
mean water surface and at right angles to the current.

At the time of the inspection the water was high and no co
were noticed along this shore. In the still water on the up
the piers and in the depression of the river bank there was a
the grease and the lighter particles of the sewage from the out
outlets and in the shallow water along the water's edge ther
erable sludge and fungus growths, evidently caused by depo
sewage discharged above. At some of the piers, which were
merged by high water, floating feces were seen along the upst
the riprap.

In view of the fact that the construction of sewers and the
sewage therefrom into the Raquette river by the village of Pots
notification of or permission from the State Department of Hea
lation of the Public Health Law and that the provisions for the
future disposal of the sewage of this village are not in accordan
best practice, it may be well to review briefly the provisions of
to state wherein the development of the sewer system and the pr
the present and future disposal of sewage from the village have n
ried out with a view to the best results obtainable in avoiding nu
guarding against infection of public waters.

The Public Health Law provides (see section 76 to 87 inclusive,
5 of the Public Health Law, constituting chapter 49 of the Laws
amended by chapter 553 of the Laws of 1911), that no sewage, garl
etc., etc., shall be discharged into any of the waters of the Stat
express permission from the State Commissioner of Health. The
provides that all plans for the installation or extension of sewer sy
sewage disposal works shall be submitted to the State Department
for examination and must be approved by the Commissioner of Heal
construction on such work shall be commenced. It also provides th
penalty for the discharge of sewage from any public sewer system

of the waters of the State without a duly issued permit for which a permit is required by this article shall be five hundred dollars, and a further penalty of fifty dollars per day for each day the offense is maintained——"

In view of the noxious character of untreated sewage as regards the causing of nuisances associated with the production of odors and unsightly conditions, and also as regards the possible causing of disease from infection of bodies of water used for public water supply purposes, it is important that works for the collection and disposal of sewage should be so designed as to prevent or minimize these undesirable and dangerous conditions. To provide such works usually requires a broad study of local conditions, and the likely needs of the future as well as present needs. In fact all sewer systems should be projected to serve the probable future development of the municipality or district in order that it may be extended in the most economical manner along the lines laid down in a comprehensive and predetermined plan. In the light of our present knowledge of the methods of sewage purification and the growing necessity of purifying sewage before it finds its way into the State waters, it is usually necessary that systems should be designed as to allow the economical installation of purification works in the future even if they are not essential to present needs.

Conditions at Potsdam would indicate that either comprehensive plans for the disposal of the sewage of the village without nuisance were not projected at or since the time of the construction of the first sewers or else no considerable study was given to the location of outlets with reference to properly caring for the sewage by dilution or anticipating a time when it might be necessary to bring all the sewage to one or possibly several points for treatment before discharging it into the river.

In addition to the local nuisances which are revealed by the present inspection, the existence of sewage in the Raquette river at Potsdam is a menace to the health of the people of the village of Norwood who take their public water supply from the river at a point some 6 miles below the sewer outlets of the village of Potsdam. Analyses of this public water supply made by the State Hygienic Laboratory indicate that the water contains sewage bacteria in such great numbers as to indicate serious pollution by organic matter from human sources.

I beg to submit the following conclusions:

1. That pollution of the Raquette river and the local nuisances resulting therefrom are largely due to the discharge of untreated sewage through many outlets into a lesser channel of the Raquette river.

2. That the discharge of untreated sewage into the Raquette river and the construction of sewers by the village without the approval of the State Commissioner of Health is in violation of the Public Health Law.

3. That the discharge of untreated sewage into the Raquette river at Potsdam is a constant menace to the health of the inhabitants of the village of Norwood which takes its public water supply from the river at a point 6 miles below the sewer outlets in Potsdam.

I would therefore recommend that the authorities of the village of Potsdam take immediate steps to draw up and submit plans to this Department for a comprehensive system of sewers and sewage disposal which should show, in addition to the present system of sewers, the sewers which would be necessary to serve the present unserved portion of the village, the point or points of ultimate disposal, works for the treatment of the sewage before discharging into the river with provisions for future extension, and the necessary intercepting sewers to convey the sewage from the present outlets to the point or points of disposal. In carrying out these recommendations it would probably be necessary to make a study of local conditions in order to arrive at the most economical method of eliminating the present conditions attending the discharge of sewage into the Raquette river. Therefore, I also recommend that such studies and investigations be made by the village prior to the submission of plans to this Department for approval.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

A copy of this report was transmitted to the village authorities.

RENSSELAER

ALBANY

EUGENE H. PORTER, M.D., *State Commissioner of H*

DEAR SIR: — I beg to submit the following repor plant of the Rensselaer Gas Company made at you Holmquist, assistant engineer of this Department, o

The superintendent of the plant was not in the the inspection and the men employed at the gas wo familiar with the operation to permit of an intelli after inspecting the outlet of the sewer from the advisable to defer the inspection until the following superintendent was expected to be present.

The inspections of the plant showed that the waste seal and wet scrubbers is discharged into a covered capacity of about 2,500 gallons according to Mr. S. P. of the plant. The construction of the tank could not as it was located below the ground surface and not which accumulates in the bottom of this tank is pum sold. The effluent from the settling tank is dischar a short distance from the plant and flows through a before it reaches the stream. The oil, however, is not by this process inasmuch as irridescent films of oil co down the creek to the river on the first day of the inspec was in operation. This would also indicate that the set properly constructed with reference to baffles and outlet a did not have sufficient capacity.

The character of the wastes from this plant could in improved and the amount decreased by substituting dry scrubbers, by installing a return water system in connect boxes and by increasing the settling capacity and remode tank. In order to still further improve the character of the probably be necessary to filter them before they are discharg by a more efficient method than that practiced at the plan

I would therefore recommend that a copy of this report Rensselaer Gas Company and that they be advised to follow mendations embodied in this report.

Respectfully submitted,

THEODORE H

Ch

A letter enclosing a copy of this report was addressed to Gas Company urging that steps be taken to effectively remove from the river. A reply dated May 8 was received stating tha was being built.

SLATE HILL (Town of Wawayanda)

ALBANY, N. Y., *Octobe*

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany,*

DEAR SIR: — I beg to submit the following report upon an in made in regard to the alleged pollution by wastes from the Clo Creamery of a stream in Slate Hill, an unincorporated village in of Wawayanda, Orange county. The inspection was made on Octob by C. A. Howland, sanitary inspector.

The creamery is located close to the New York, Susquehanna and railroad tracks in the southwestern part of the village. The re milk vary from a minimum of 1,500 gallons to a maximum of 4,500 according to the season. Pot cheese is manufactured and also thre

cheese, consisting of three parts of skimmed milk and one part of pure milk. Butter is occasionally made to use the surplus cream. This amounts to as much as 400 pounds per day in the spring.

The inspector, accompanied by Mr. W. H. Budd, an employe at the creamery, investigated the disposal of the wastes from the creamery. A 6-inch tile drain carries these wastes under the railroad tracks to a catch basin about 60 feet from the creamery. This basin is constructed of concrete about 2½' x 2½' covered with boards. Its use is apparently to change the direction of the drain and also to settle out some of the heavier solids. It is probably too shallow and the inlet and outlet appear to be located too low to accomplish much sedimentation. Joe creek, about which the complaint was made, flows northeast about 6 feet northwest of the basin. At this point and above it is a stream of clear water from 3 to 4 feet wide and 6 inches to a foot deep, flowing in a steady current of good volume. The bed is gravelly and while showing the usual aquatic growths is free from extensive deposits of muck or sludge.

From the catch basin this tile drain leads at right angles to the inlet, following the railroad tracks northwesterly about 350 feet, where it turns and leads north about 75 feet to a covered concrete cesspool or settling tank. The tank is 15 ft. by 10 ft. by 4 ft. deep, the inlet and outlet being located near the top. The inspector was informed that it has no bottom but is located in hard pan, consequently there is little percolation into the soil. No evidences of percolation could be observed on the bank of the stream, which is lower than the tank and flows about 10 feet from it. At the time of the inspection the tank was full of a greenish grey liquid having a dirty greyish scum on top. No large volume of gas was given off, indicating that purification was not active in the tank.

An 8-inch tile drain leads about 100 feet northeasterly, gradually approaching the stream, into which it discharges in a large pool. The effluent was greyish white and the surface of the pool appeared yellowish in color. When stirred the water showed whiter and the bottom gave off considerable volumes of gas and appeared black. A distinct characteristic odor was noticeable. The usual greyish growths accompanying pollution of this kind showed on objects in the stream. Above the pool the water was clear, but the bottom, when stirred, gave off the same characteristic odor and showed by its grey color, black underneath, the evidences of pollution. Mr. Budd informed the inspector that this was due to an old drain which had followed the bed of the stream polluting it through leaks. This old drain is now removed. It was further stated that the company was about to remedy the conditions caused by the present cesspool and proposed to build another in a more sandy locality. The inspector recommended that they wait for advice from this Department before taking such a step.

The inspector followed the stream down for a distance of about one-half mile and observed the same evidences of gross pollution. Fish had been noticed in the stream above the drain but not below, their place being taken by frogs and turtles. This indicates that the oxygen is used by putrefaction processes and only those animals which derive their oxygen from the air can live. The stream was further observed at a bridge about one mile below the drain and while the pollution was not so gross it was still evident.

The inspector called at the Durland residence. The Misses Durland alleged that the odor from the stream caused them much discomfort and further that the pollution of the stream injured it as a watering place for their stock. They stated further that the present discharge drain is located on their property and had been placed there without their permission. The stream flows in the rear of the house and about 100 feet distant. The greyish growth underlain by black muck was apparent and a decided characteristic odor could be noticed. A privy overhangs the bank about 35 feet from the stream, but it is in good condition and while liquid probably backs into the stream it would not produce the evidence of putrid milk products apparent therein. Other privies are located near the stream in the village, but they are above the drain and no evidences could be found to indicate that they caused serious pollution.

The records of this Department show that no per the Clover Farms Company allowing the discharg stream from the creamery located at Slate Hill. The wastes, therefore, constitutes a violation of the Public it appears from the conditions described above that to such an extent that odors arise which constitute a should immediately be taken to remedy these conditio pollution of the stream and the emanation of odors.

If the proposed method of installing a cesspool in will probably be necessary to change the location of t to time to prevent the clogging of the soil to such an pool will flow over the ground and into the stream. I of a system of radiating agricultural tile under the allowing the application of the effluent from the cessp of land, this may be avoided. A more effective metho to install some form of sedimentation tank to be f through beds constructed for that purpose. Any meth charge of an effluent after treatment requires that a per this Department allowing such discharge.

I would recommend, therefore, that a copy of this r to the board of health of the town of Wawayanda with they take immediate steps toward preventing the continu stream. A copy should also be sent to the Clover Farm West 48th street, New York city, with the recommenda the employment of some method such as is suggested in t the wastes from their creamery at Slate Hill that gros stream and the emanation of odor such as to constitute will be prevented.

Respectfully submitted,

THEODORE

Letters inclosing copies of this report were addressed to of health and to the Clover Farms Creamery Company u be taken to remove the pollution from the stream. A con received from the health officer stating that by building add in a different location the pollution had been removed fron

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TROY

ALBANY, N. Y., Ap

EUGENE H. PORTER, M.D., *State Commissioner of Health, Alban*

DEAR SIR: — I beg to submit the following report on the ins plant of the Troy Gas Company at Troy, N. Y., made at by Mr. C. A. Holmquist, assistant engineer in this Department with Mr. H. C. Shields, superintendent of the gas company, 1912.

This inspection showed that although the amount of gas pro plant has increased about 25 per cent. since 1907 no changes hav in the method of caring for the wastes from the plant since th made by a representative of this Department April 29, 1908.

The tarry wastes from the seal boxes are discharged into a ta which they flow by gravity into three settling tanks connected in located near the docks. These tanks also receive the drips and wastes from the plant.

The tar which accumulates in the bottom of the settling tank i fuel and the effluent from the last tank is discharged through outlet into the river.

Dry scrubbers have been used at the plant since 1907, thereby reducing the original wastes by about 50 per cent. It appears, however, that the amount of wastes produced at the plant could be further reduced by installing a return water system by means of which the water from the settling tanks could be returned to the water seal and a better effluent would probably be obtained if additional settling tanks were added and additional baffles constructed in these tanks.

Although the river was high at the time of the inspection and the effluent pipe submerged, beads of oil could be seen rising to the surface of the water and spreading out, forming irridescent films. This condition was noticed for a distance of nearly 1,000 feet below the plant.

In conclusion I would state that the character of the wastes discharged into the Hudson river from the plant could in all probability be improved by reducing the amount of the wastes produced at the plant and by increasing the settling plant capacity of the disposal plant. In order to still further improve the settling tank effluent it would probably be necessary to filter the wastes before they are discharged into the river.

I would recommend that a copy of this report be sent to the Troy Gas Company and that they be advised to follow out the recommendation embodied in this report.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

A copy of this report was inclosed in a letter addressed to the Troy Gas Company urging that the matter of effectively treating the wastes be taken under immediate consideration. A reply dated May 10 was received stating that if the present line of dock was changed certain improvements would probably be made, but that delay was caused by the building of the new dam and lock.

WESTFIELD

ALBANY, N. Y., *November* 8, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon an inspection made in regard to the alleged pollution by wastes from the Welch Grape Juice Factory, of a stream in the incorporated village of Westfield, town of Westfield, Chautauqua county. The inspection was made on October 30, 1912, by C. A. Howland, sanitary inspector, as a result of complaints made to this Department by Messrs. Samuel Johnson and Geo. Bigbe.

The inspector conferred with Dr. Edgar Rood, village health officer, regarding the matter, and in company with him, visited the Welch factory. He later made a more extended inspection of Chautauqua creek and interviewed several of the complainants. Dr. Rood stated that no complaint had been received by the local board of health in regard to this matter. Several members had investigated the conditions, but no action had been taken. The inspector interviewed Dr. C. E. Welch and his superintendent, Mr. Smith, who furnished the data relating to the operation of the plant, contained in this report.

The Welch Grape Juice Factory is located a short distance south of the L. S. and M. S. and N. Y. C. and St. Lawrence railroad tracks in the central part of the corporation. The process of manufacture consists of pressing out and bottling the juice of grapes. The wastes resulting are the stems and pomace, consisting of the skins, pulp and seeds, and the wash water from the blankets enveloping the grape cheeses in pressing, and from the kettles, floors, etc. No chemicals are used in the plant except about five pounds of chloride of lime, in very hot weather, because of the flies. The largest volume of work is done during about three weeks, in the pressing season in the fall, when over one hundred tons of grapes are pressed per day of 24 hours. At

this time about 250 men are employed and at othe
water is obtained from the village supply and averag
130,000 gallons per day of 24 hours.

At the time of the inspection, the stems were being
vacant land west of the plant, while pomace was pile
nearer the buildings. The liquid wastes passed throu
and a 3-inch cast-iron pipe west about 350 feet to th
bank where they fall into a flat area. They are condu
in a ditch. A culvert carried them under the Chaut
Electric Railroad track and a continuation of the ditc
gentle slope across the line of the 8-inch village sewer
creek which flows north to Lake Erie. Besides the wa
of manufacture, the sanitary sewage from the factory
the 8-inch tile and ditches. It is understood that the
is used only during the pressing season. This takes
larger volume of suspended matter and sanitary sewage
8-inch tile.

The wastes discharging from these pipes into the ditch
color and gave off a characteristic acid grape odor. C
of skins were noticed in the low land and of seeds near
time of inspection the stream was from 25 to 30 feet wide
current of considerable volume. It is shallow and broad
the shale and slate underlying the locality. Recent rain
creased the volume which in summer is much less. Al
water is clear. Below, however, the discharges color it p
large volume of water then flowing, this effect is soon r
lost in a distance of one-quarter of a mile. The skins c
the water as far down as one-half mile below. They were
bers and if a cubic foot of the water was allowed to settl
not cover the bottom of a cubical vessel.

The inspector talked with Mr. Samuel Johnson and other
near the stream and whose cattle drink in it. Mr. Johns
adjoining the Westfield disposal plant and his own cows dr
and can pass in the stream in front of the plant. He alleg
umes of the wastes from the factory had been apparent at
one-half mile below the factory. These include the pomace.
been found on the bank. Several cows have died but it w
stated by the veterinary surgeon employed that the deaths
due to the factory wastes. A series of five affidavits by differ
shown, alleging generally that the stream is largely polluted
used for water supply for cattle.

The pollution appears to extend for a number of years ba
therefore, be the result of any particular or unusual operatio
It was claimed that considerable deposits of pomace collecte
and bottom of the stream and that the water was highly colo

An examination of the records of this Department show t
has been issued to the Welch Grape Juice Company situated
allowing the discharge of wastes into Chautauqua creek. The
incorporated in this State April 23, 1903, but the volume of
obviously been increased since May 17, 1903, hence the present
wastes constitutes a violation of the Public Health Law, article

An examination of the plans of the Westfield sewerage syst
this Department shows that, allowing for all possible growth, t
ultimately contributing sewage to the 8-inch sewer passing west
factory may be placed at about 1,620.

The topography of the locality indicates that this will not be
a long time in the future. At the usual assumption of 100 gallon
per day, this gives a flow of about 130,000 gallons per day from
a total flow of 292,000 gallons per day is obtained. This reduc
0.45 cubic feet per second. The capacity of the 8-inch sewer on th
slope of 0.4 per cent. for its whole length is about 0.65 cubic feet
flowing full. This gives a velocity of about 2 feet per second.

From the above computation it is seen that the present sewer is adequate to take care of the present discharge from the factory together with all of the domestic sewage which it will probably be called upon to carry and leaves none for growth at the factory. The velocity would be sufficient to prevent deposits in the sewer.

The capacity of the sewage disposal plant of the village is ample to care for the entire sewage wastes which it is estimated are discharged from the grape juice factory, in addition to the sewage from the village, and it is not likely that the capacity of the disposal plant would be overtaxed for many years to come if the sewage and wastes from the plant were admitted to the sewer system of the village and the stream relieved from pollution.

In view of the above and in order to relieve the stream from pollution by both sewage and wastes from the factory, I would recommend that the village board of health require the Welch Grape Juice Company to discontinue the discharge of sewage and wastes into the stream and connect the factory with the village sewer system.

It would seem entirely reasonable for the village authorities to require the company to install a settling tank on the line of the sewer from the factory in order that the large quantities of grape seeds and skins carried by the flow of waste water from the factory may be eliminated before the discharge of the wastes into the village sewer.

It should also be noted that the wastes from the plant if discharged into the village sewer system and sewage disposal plant will constitute a considerable proportion of the total amount of sewage to be treated. While no specific provision was made by the designing engineer for caring for these wastes, the disposal plant is adequate at present, and will be for some time in the future, to treat the additional amount of wastes involved. The inclusion of these wastes will, of course, render an enlargement of the plant necessary at an earlier date in the future if the growth of the village continues than would otherwise be necessary. Furthermore, it should be noted that the effect of the inclusion of these wastes on the operation of the disposal plant cannot be definitely known in advance, although it is not believed that their inclusion will seriously affect the operation of the disposal plant. If, on account of the character of the wastes, it should be found in the future that their treatment in the village disposal works affects the proper operation of the plant to an unwarranted degree, the village might at that time require more complete treatment of the wastes, other than the domestic sewage, before their discharge into the village sewer system than will be afforded by the construction of a settling tank by the company as referred to above.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Letters, enclosing copies of this report, were addressed to the village board of health and to the board of trustees, urging that they co-operate in removing pollution from the stream in the manner suggested in the report.

WHITE PLAINS

ALBANY, N. Y., *October* 1, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report upon an investigation made in regard to an alleged nuisance caused by the pollution of Davis brook in the incorporated village of White Plains, town of White Plains, Westchester county. The inspection was made on September 28, 1912, by C. A. Howland, sanitary inspector, in company with Mr. Edward Charbonneau and Mr. James H. Moran, his attorney.

The records of this Department show that a plan for a proposed storm water sewer through and along Davis brook was approved on July 10, 1900. This sewer, as shown on the plan on file in this Department, was to extend from the New York Post road to the west side of Bronx street, at which point it discharges into Davis brook about 350 feet above its junction with the Bronx river.

The inspector followed the stream throughout its length in the village. It is a small winding stream of varying width and depth averaging about 3 to 4 feet in width and ¾ of an inch deep, which at the time of the inspection flowed in a steady current of steady volume. Between the New York Post road and Martin avenue the brook is covered, but below this to the Bronx river it is open practically all the way except at one or two places, such as Railroad avenue, where it is covered as it passes under houses or streets. The appearance is much the same throughout. Many stables are located near or built over the stream and building has encroached upon it. The yards of houses abut upon it. The Suburban Laundry Company was discharging from its plant wash water from a wooden conduit. As a result of the above conditions the brook is greatly polluted by refuse of all kinds which is thrown there. A number of the drains of different sizes were noticed discharging into it which were believed to be storm water drains or drains from house leaders. It could not be definitely proven that any sanitary sewers discharge into the brook although evidence in one or two cases indicated pollution from privies. The brook flows under the New York Central tracks through a culvert approximately 3 feet high by 6 feet long screened by rails laid about 1.5 feet on centers. This culvert was being repaired at the down stream end, which it is understood was smaller than the upstream end. The foreman in charge stated that the culvert was found clogged with rubbish. He stated that the culvert was found to be put in good shape and made of sufficient size to allow proper egress for the water.

It was alleged by persons with whom the inspector talked that in time of freshet the water in the stream overflows its banks, flooding nearby cellars, sidewalks and streets. The inspector entered one cellar in which considerable silt had been deposited by floods and the water marks on the wall indicated that a depth of 3 feet was sometimes reached. The refuse in the stream, such as bedding, old clothes, etc., evidently aid in backing up the water. At the time of the inspection no considerable odor of an offensive nature could be observed as coming from the stream but it was obvious that the decaying refuse, etc., produce conditions conducive to nuisance.

The inspector talked with Dr. Edwin G. Ramsdell, the village health officer, who stated that the conditions in the stream had been a source of complaint for some time. He said that the occupants of houses along the stream had been notified to keep contamination out of the stream. The brook is cleaned yearly at a cost of $125 by a squad of men who proceed along the bed. Thirty loads of refuse were removed at the last cleaning. Notices have been posted at several points as the inspector observed. The proposition of covering the stream or making some other permanent remedy of the conditions has been placed before the board of trustees for a number of years but not undertaken because of an alleged lack of funds. The village employs a sanitary inspector, part of whose duty it is to inspect and prevent pollution of the stream.

In view of the above inspection it appears that Davis brook is polluted by refuse of every kind to such an extent that the production of local nuisances is inevitable. Since no sanitary sewage in any great volume evidently enters the brook it is obvious that the removal of this refuse and the stopping of further pollution by this means would eliminate the cause of nuisance. The flooding of cellars and streets must obviously be remedied by providing a clear channel of flow and ready egress to the Bronx river.

I would therefore recommend that the board of health of the village of White Plains be advised to take immediate steps toward the removal of all refuse from the stream and its maintenance in a sanitary condition. This should be effected by the increased vigilance of the inspector or the employment of additional inspectors and the vigorous prosecution of violators of such rules and regulations as the board may make under the authority vested in the board by Article 3, section 21 of the Public Health Law.

Respectfully submitted,

THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the local board of health and to the complainant. It was urged that action be taken to remedy the insanitary conditions along the brook.

In addition to the foregoing, cases of stream pollution were examined into and advice was given through correspondence in the matter of abatement of nuisances arising from stream pollution in the following places:

Alden
Angola
Arlington
Bayshore
Canastota
Cazenovia
Corning
Dryden
Fleischmanns
Fort Edward (Town)
Franklin (Town)
Franklinville
Fultonville
Granby
Jordanville
Lenox (Town)
Lyndon
Lyons
Malone
Medina
Millerton
Newfane
Nichols
Oyster Bay
Painted Post
Pleasantville
Port Jefferson
Potsdam (Town)
Redfield
Riverhead
Rye
Scriba Center
Seneca Falls
Sinclairville
Sloane
Tivoli
Tupper Lake

INVESTIGATION OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

INVESTIGATION OF PUBLIC NUISANCES NOT ARISING FROM STREAM POLLUTION

Although the investigation of public nuisances created by the discharge of sewage and other wastes into streams of the State constitute a very important part of the routine work of the Engineering Division, the ever-increasing number of local nuisances not arising from stream pollution which are referred to this Department by municipalities and individuals in all parts of the State during the past few years has made this work of almost equal importance. Many of them are, however, of a purely local nature and should be handled by the local boards of health which have full jurisdiction, under the Public Health Law, in matters of this kind.

Owing to the large number of these local nuisances, it has become necessary to refer many of the less important ones to the local health boards for action, the Department investigating and reporting on only such nuisances are are of a public nature, i. e., affecting a considerable number of persons, or which do not come entirely under the jurisdiction of the local authorities, or for particular reasons cannot be properly handled by the local boards. Of the nuisances which have thus been taken up by the Department for action may be mentioned those arising from swamps and improper drainage facilities; emission of smoke and fumes from industrial establishments; improper maintenance and operation of rendering plants; improper method of garbage disposal; and insanitary conditions arising from inadequate sewerage facilities.

The municipalities of the State where the more important of these nuisances have arisen and have been referred to this Department for investigation and action during 1912, are as follows:

ALTAMONT

ALBANY, N. Y., *June* 4, 1912.

MR. THEODORE HORTON, *Chief Engineer, Department of Health, Albany, N. Y.:*

DEAR SIR: — I beg to report as follows on an inspection of insanitary conditions in the village of Altamont caused by the discharge of sewage from the two combined sewers in Main street into a small stream or drainage ditch which starts at Main street about 60 feet west of Indian Ladder road in said village and flows southerly.

This inspection was made pursuant to a request from Mr. James E. Kirk, village president, following complaints which were made to this Department in 1911 by a resident of the village relative to the insanitary conditions at this point.

To review the sewage situation in Altamont it should be stated that plans for a modern system of sanitary sewers and sewage disposal works were approved by this Department on August 19, 1907. It is understood that the village authorities caused the preparation of this plan for sewers in order to construct a sewer in Main street which would form a part of the permanent general sewer system of sewers, following which a macadam pavement was to be laid through Main street. Instead, however, of constructing the sewer in Main street in accordance with the plan, two storm or surface water sewers 12 inches in diameter were laid from points near the D. & H. railroad as it crosses Main street along each side of the street under the gutters to the stream or drainage ditch near the Indian Ladder road. Thus no portion of the permanent general sewer system as shown by plans approved by this Department has as yet been constructed in the village.

It appears that prior to the construction of the two sewers in Main street noted above blind drains and ditches had been laid or maintained along each gutter in Main street, which ditches or drains received overflow from cesspools and sewage disposal plants on individual properties consisting of a settling tank and gravel filter. At a point near Indian Ladder road these ditches were uncovered and insanitary conditions resulted. From seven or eight such individual properties overflow from cesspools or sewage disposal plants discharged into these old ditches or drains and the overflow now is discharged into the two storm sewers. There have been one or two additional overflow pipes from cesspools or sewage disposal plants connected with the storm sewers in the past year.

It is thus clear that the reconstruction of the sewer in Main street and especially the admitting of additional sewage to this sewer and the discharge of all such sewage into the drainage ditch or stream near Indian Ladder road is contrary to the provisions of the Public Health Law since no permit for such discharge of sewage has been granted by this Department. The permit issued in connection with the approval of the plans for a sanitary sewer system in Altamont allowed the discharge of effluent from the septic tank, forming a part of the sewage disposal works shown by the approved plans into a tributary of Bozen Kill.

It is unfortunate that proper provision was not made at the time of the construction of the sewers in Main street for the construction of a sewer which should receive sanitary sewage only and which should be in accordance with and form a part of the sewer system as shown by the approved plans.

The condition now existing is serious in that very insanitary conditions are created at the point of discharge of the two storm sewers in Main street and early action should be taken by the village to abate the present insanitary conditions. The stream clearly shows the effect of the discharge of house sewage and wastes and although at the time of the inspection no nuisance could be said to be caused by such discharge of sewage it is reasonable to suppose that during warm weather considerable odors would arise from the present condition of the drainage ditch or stream near the Indian Ladder road.

Respecting the steps which might be taken to remedy these insanitary conditions, it would seem that the most effective step would be the construction

of the whole or a part of the permanent general system of sanitary sewers as shown by the plans approved by this Department. The permit issued required on first construction that the septic tank only and not the contact beds forming a part of the sewage disposal works should be constructed for the purpose of effecting a partial treatment of sewage before it is discharged into a tributary of Bozen Kill at a point some 1,400 feet north of Western avenue near the intersection of Western avenue, Main street and Indian Ladder road. It is possible that if the matter is carefully studied by the engineer for the village a plan may be devised whereby one of the present sewers in Main street may be used to carry surface water and the other may then be used to convey sanitary sewage and cesspool overflow exclusively.

I would suggest that a copy of this report be transmitted to the village authorities and that they be urged to at once take up the question of submitting to the taxpayers a proposition to construct all or a few more necessary portions of the sanitary sewer system for the village since the construction of a few of the more necessary sewers would improve the sanitary conditions of the village and would abate the nuisance now existing near Indian Ladder road.

Respectfully submitted,
H. B. CLEVELAND,
Principal Assistant Engineer

Letters inclosing copies of this report were addressed to the local board of health and to the village president urging that the village construct all or a portion of the general sewerage system of the village in order to remedy the existing conditions.

NISKAYUNA (Town)

ALBANY, N. Y., *December* 5, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report on an inspection of an alleged nuisance due to obstructed surface drainage at Stop 3, a station on the Schenectady Electric Railway, in the town of Niskayuna, Schenectady county. On November 17 C. A. Howland, sanitary inspector, met W. J. Regan, of Schenectady, at Stop 3 and went over the situation with him.

A pond about 150 feet long by 65 feet wide has been formed in a low area beside the Albany-Schenectady State road by filling at the side of a driveway giving access to several houses standing back from the highway. At the time of the inspection thin ice covered this pond and a light fall of snow lay on the ground. No odors or appearances which might be said to constitute a public nuisance were, therefore, apparent. Two privies stand close to the upper end of the pond and a wooden box drain was found ending in it.

Mr. Regan informed the inspector that previously a wooden box culvert provided an outlet under the driveway to a ditch along the side of the State road fill. He alleged, further, that the fill which was made by Mrs. K. Steers had covered up the end of this culvert, forming the pond, which in summer gives rise to foul odors and in times of high water backs up to a house owned by him.

The inspector ran a line of levels from a point in a ditch draining the area above the pond to the lower end of the pond and along the ditch to a flat area upon which it discharges. This showed that the lower end of the pond was about 3 feet lower than the ditch at its upper end; that the upper end of the outlet ditch is about 0.5 feet lower than the end of the pond and that the ditch drops about 3 feet in its length of approximately 225 feet. Only the lower end of the culvert could be seen. There was no discharge from this and the water in the ditch appeared stagnant.

The flat area in which the ditch ends drain culvert under a partial fill, probably for a road. the lower end of this culvert at the time of th be followed through a grove of young trees, ditch along the side of the State road fill. T masonry and concrete culvert under the road a flow had increased to a brook of some size, flow

It is shown by the difference in level between the pond and ditches, that the water in the pond naturally draining the section, if the upper end by the fill and the channels were kept open. Th vegetation and the culverts choked with sand. erly drain the section, an outlet should not only made by Mrs. Steers at the lower end of the pond culvert should be opened and kept clean. It shou tention of the property owners and to the board o kayuna that the discharging of wastes into this p luting of the water by excretal matter without per is in direct violation of the Public Health Law.

It is evident that the filling in of the culvert by way on the property of Mrs. Steers has interfered of the district and should be corrected by the openi re-establishment of the drainage conditions existin the roadway.

I would therefore recommend that a copy of this the board of health of the town of Niskayuna and require the property owner responsible for the interf and established drainage of the section to reopen the

Respectfully submitt

THEOL

Copies of this report were inclosed in letters addresse health and to the complainant. The board of health proper action to abate the nuisance and a letter was re clerk stating that such action would be taken.

OLEAN

ALBANY, N. Y., J

MR. THEODORE HORTON, *Chief Engineer, State Department N. Y.:*

DEAR SIR: — In accordance with the directions given me January 23, I have investigated, January 29 and 30, co along Olean creek and referred to in communications from president of the local board of health. I found the con follows:

At the mouth of Olean creek there exists a dam about eig and as a result of the existence of this dam, water is back pond in the immediate vicinity of the dam and slack water i cept at the time of floods, for a distance of perhaps two mi adjacent to the creek are low and must have been at all times flow from the creek, even before the construction of any dam also are submerged occasionally, that is, at intervals of from years, because of high water in the Allegany river. These la sufficient to overtop the dam and back up the waters of Olean the surrounding country.

In spite of the unfavorable topography, the construction of houses in the vicinity of the creek has gradually proceeded and the low lands have, little by little, been partially cultivated and reclaimed until a population, said to be about 500, is living in such a relation to the creek that high water is a menace to their comfort.

The dam is said to have been built in 1857 and to have been in continuous use since that time. The owner of the dam is emphatic in his statement that the height of the dam has not been changed since its original construction and that, inasmuch as the original builder owned some 1,200 acres above the dam, so that the flooding was entirely on his own land, and since all subsequent sales from the original property were made subject to the water rights of the mill property, no suit for damages can lie. The attorney for the complainants, on the other hand, claims that the actual crest of the weir has been raised 33 inches, that flush boards are in constant use, raising the back water two feet in addition. They further claim that at times of high water the head on the weir is at least three feet and is so maintained for several days; whereas by the use of gates duly provided, this damaging head could be prevented and should be prevented since it produces a height of back water in excess of that conveyed in the water right.

It is evident, I think, that these questions are all outside of the Department and that whereas the question of overflowing lands may be construed as a public nuisance, in this case its value as a part of the whole question is so small that it seems to me it can be neglected and the issue squarely joined on the riparian rights question.

There is in addition, however, another question which is more definitely one of public health. It is asserted by the complainants that there are at present discharging into the back water of this dam a number of private and public sewers and because of the presence of the dam the ordinary free fall of the stream is interfered with and therefore the pond, receiving an excess of organic matter, sets up putrefaction and causes most unpleasant and objectionable odors. Apparently, there is no doubt of the fact that odors do arise, at times of low water, from the uncovered swamp areas. Unprejudiced citizens were outspoken in this particular. But whether the odors are those inevitable where swamp land is alternately wet and dry, or whether they are due to the accretions of organic matter artificially introduced, I was not able to determine. At the time of my visit, no odors were perceptible and the stream was running clear and apparently pure below, as well as above, the pond.

It should be noticed that if organic matter is discharged into this stream and pond, it is largely so discharged by those complaining in this case and they ask that the dam be removed in order that they may continue their present method of getting rid of the household wastes without discomfort to themselves and at practically no cost.

The dry weather flow of the creek which has a watershed of about 200 square miles is probably not less than 20 cubic feet per second, a flow ample to prevent a nuisance with a population of 5,000 draining into it at any one point in a concentrated flow.

It may also be pointed out that certain persons have acquired and own property in the vicinity of the creek which would be valuable land for vegetable gardens if danger from flooding could be averted. It is said, by way of illustration, that one person, a comparative stranger in the community, bought 20 acres or so, and after thorough cultivation and planting was on the point of reaping his harvest, when high water in August flooded the land a foot or more deep for ten days, thereby causing the loss, he claims, of $5,000. Except for the fact that such pecuniary losses follow high water and except that it is believed by the owners of property subject to overflows, that the removal of the dam would lessen such danger, I do not believe that the danger to health would have been pressed. I cannot but think that, generally speaking, the individuals complaining of conditions are, so far as health is concerned, largely responsible for those conditions themselves, and that if their wastes were properly cared for, there would be no ground, on

the score of health, for asking for the removal
local board of health was acting wisely when
matter of public health. It might be possible
of the better sanitation in this particular pa
measure, buy the mill dam and the water rigl
the stream and perhaps dike the bank. It ma
as a public health measure this will commenc
and the common council may provide the ne
I cannot feel, however, that it is now so imp
require any action of the local board of healt

Yours

Subsequent to the above investigation and rep
to the Department and further correspondence
formal hearing was held at the Department on
ferent parties interested were present or represe

The following report was submitted on March 18

ALBANY

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — In accordance with your request I h
report upon the conditions of Olean creek above t
referred to you by the local authorities and made
by the engineering division.

Following the hearing in your office on March
careful consideration to the facts, opinions and test
time as well also to the information and data by P
assistant engineer, secured during his inspection of t
dam which he was directed to make and which was
under date of January 31, 1912, and have been abl
definite opinion concerning the conditions which exi
relations which these conditions bear to the health a
munity and of the extent and limitations of authority
may have with respect to any action that might or sl
rect any existing objectionable conditions.

The various facts and factors involved in the solut
been presented and carefully discussed not only at th
reports of Professor Ogden, and without entering into
of them I will present at once what may in my opini
the salient facts in connection with the case and as to
ing them as follows:

1. That a dam was built many years ago on Ol
junction with Allegany river which so raises level o
ordinarily considerable areas of land adjacent to the

2. The height and usual operation of dam is such
siderable areas to very shallow depth during low flow
duce objectionable conditions with respect to vegeta
creation of odors at certain seasons of year, and ten
flood heights of waters above the dam at other seasons
objectionable conditions and possibly damage to p
vicinity.

3. That there is no evidence presented or available t
narrowing of waterways by railroad embankments is
measure responsible for this excessive flooding above t
that the back water from the Allegany river is not in it
cause to account for much or most of the flooding of l
the dam, at least for what might be considered excessive

4. That the people of Olean who reside adjacent to

lands discharge sewage through public or private sewers into these waters and that those people or other parties have dumped garbage and refuse upon these lands that became flooded, the result of which is either the primary cause or at least a secondary cause of the nuisance from odors and other objectionable conditions that are noticeable at times in and around the waters above this dam.

5. That there is no evidence to show that this flooding or backwater conditions above the dam are in themselves responsible for the nuisances and objectionable conditions complained of, but, on the contrary, I am of the opinion that if the sewage and other pollution of those waters be removed that the nuisance will be largely if not entirely removed and that no danger to health from the flooded land will result if conditions favoring mosquito propagation are guarded against and removed.

6. That aside from health questions involved in the removal of pollution there can be no doubt as to the desirability of removing the dam and preventing flooding unless the land under and adjacent to flooding waters is treated from an engineering or landscape standpoint and the whole territory transformed into a park.

7. That in consideration of any such improvements as above referred to, which are aesthetic and not health considerations, the question of riparian rights, easements, assessments of costs of improvements are all matters which are of a local nature and which should be properly considered by and between the city authorities and those owning riparian rights along the stream.

It would seem to me in view of these facts and conclusions that the proper course for the city to follow is first to take such action as will remove permanently all the sewage and other pollution that now reaches these waters and then to have a local investigation by competent experts to determine

1. The desirability and expediency of either removing the dam or of making a park of this section of the city.

2. Make a study of best method and the cost of each of these methods of improvements, including all adjustments, damages to riparian rights which the law may require, and the benefits to be derived from each.

3. Make a choice of which plan should be adopted, perhaps placing the alternative propositions to the people for vote, and then proceed at once with the prosecution of the work.

I believe that if the pollution is removed from this water the primary and most important objection will be eliminated. I am of the opinion also, however, that a great asset will be gained the city by going further and improving the water ways or establish a park, improvements which seem to conduce to better living, better education and greater comfort in a community, improvements which every municipality which can afford it seems to be taking advantage of, and which I strongly urge in this case if the city is in a financial condition to carry it out.

Very respectfully,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the city board of health, to Mr. Geo. Oliver and to Attorney E. H. Woodruff.

OLEAN

ALBANY, N. Y., *March* 4, 1912.

MR. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR:—In accordance with your instructions I visited Olean on February 28, 1912, and with the health officer of Olean, Dr. McDuffie, inspected the jail of that city.

A steel cage with open bar doors occupies the
ment room of the city jail. I found three dist
to the room in which this cage stands.

In the first place, there are but two small c
of the room, which, therefore, must lack ventila
be particularly foul when, as the chief of police
eight prisoners provided for by the cage, some t
less wanderers who sleep on the floor, particularl

Second, the light comes from one side only and
cells on the other side of the cage are quite dark
descent light hanging from the ceiling. It will
unlikely, if not impossible. to keep the inside of
are practically in stygian darkness even in the m

Third, the plumbing in the cells is antiquate
sanitary, with no apparent attempt on the part
tain even decent cleanliness.

It may be added that the floor of the room sur
of brick and partly of stone slabs, all of it rough

I am of the opinion that, under present condi
nuisance and is a potential source of disease to t
occupy the floor or the cells themselves.

Yours respectfull

Sp

A copy of this report was inclosed in a letter a
mission of Prisons, at whose request the inspectio

OQUAGA LAKE (Town of

ALBANY,

EUGENE H. PORTER, M.D., *State Commissioner of*

DEAR SIR: — I beg to submit the following re
made in regard to the sanitary conditions surrou
town of Sanford, Broome county. This inspectio
by C. A. Howland, inspector in the Department.

In company with a committee of the Oquaga I
tion, comprising Messrs. Judge Geo. B. Curtiss, C
Zentgraf, the inspector investigated all the cottag
ings surrounding the lake in regard to the possible

The lake is approximately three-quarters of a m
by springs. The shores are steep and almost com
underlies practically the whole locality, being cov
two feet by a gravelly surface soil.

Although each cottage was inspected in turn a
tary condition, there is no need of here tabulat
methods of sewage disposal and water supply are
stances similar and can be discussed generally. A
end of the lake disposes of the sewage from about
stone cesspools from which lead blind ditches, co
surface irrigation system. This system is located
forming the natural dam of the lake and in soil wh
to care for the sewage, hence there is no possibilit
lake through this source.

The use of cesspools to receive sanitary sewage a
general around the lake. These are usually sunk
into the hard pan by blasting, walled up with ston
Generally speaking, these cesspools are of sufficien
for a considerable period providing for considerabl
ing septic action. When they overflow, however, a
do, it is questionable whether the foot or two of gr

hard pan is of sufficient extent between the cesspool and the lake to properly treat the overflow. This has been remedied in some cases by allowing the cesspools to drain into blind ditches. Where these latter are covered with sufficient soil they appear to be efficient. Two cesspools are sometimes used, the lower one receiving the overflow from the primary one.

A large majority of the cottages maintain outside privies, some of which are used entirely, others only occasionally. It was noticed that some of these are not provided with a box of any kind, and are open to insects. The distance from the lake in the majority of cases makes the possibility of pollution remote; one or two are sources of danger.

The water supply of the community is obtained for drinking entirely from springs and for washing and kitchen use by pumping from the lake. These springs are in a number of instances on the slope below the privies but not so located as to make the danger of pollution very great. Some are not adequately protected from surface wash.

The hotel and other buildings owned by Mr. W. J. Putnam and situated at the northern end of the lake are provided with a sewage disposal plant situated on the edge of the lake. This consists of a covered concrete septic tank 16.5 feet by 11 feet by 7.5 feet deep; a coarse contact bed of stone 1 inch to 3 inches in diameter, about 11 feet by 9 feet by 7.5 feet; a contact bed of finer stone up to 1 inch in diameter, 20 feet by 24 feet by 3 feet deep; and a sand filter, area about 25 feet by 25 feet. The latter is separated from the lake by a concrete wall through which the outlet pipe passes, discharging on the bottom of the lake. This plant receives the sewage from a maximum of about 120 people, i. e., 9 closets and kitchen wastes. At present the plant does not operate efficiently, the sewage rises to the top of the sand filter and appears through the turf covering it. The whole plant is covered and turfed. An electric pump has been installed which takes this overflow from the top of the sand filter and pumps it back up on the hill where it is received in a cesspool and flows through blind ditches. An examination of the various capacities and rates of filtration for the usual assumptions regarding water consumption show that the plant is probably of sufficient size to care for the sewage from the hotel. It should be ascertained if the sand filter is not clogged or that the lake is not backing up into it through the outlet pipe. An arrangement whereby the filter and stone beds could be cleaned more frequently would probably produce better results.

From the above general discussion of conditions as brought out by the recent investigation, it appears that, while it is possible to care for the sewage by individual treatment at each cottage, the initial cost and maintenance of such systems would be greater than the assessments necessary to construct a complete system of sewerage for the community. Furthermore, the assurance against pollution of the lake by improperly purified sewage under the present methods is insufficient to render the water supplies derived from the lake safe for use even as secondary supplies for washing and cooking purposes. By organizing a sewer district as provided for by the Town Law, and with excellent organization already in existence there, the work should be carried to a successful conclusion at reasonable cost. A permanent system would thereby be obtained which would completely remove any danger of pollution of the lake and also be a great addition to the attractions of the place. Such a system would probably comprise two lines of pipe, one on each side of the lake, and a disposal plant to be located beyond the morain at the southern or outlet end. It is believed that a pipe line laid in the lake itself would not only be a cause of danger from pollution but a source of continual expense and annoyance.

I would recommend that a copy of this report be transmitted to the secretary of the Oquaga Lake Improvement Association and that the Association be advised to take up at once the work of forming a sewer district under the Town Law.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

A letter, inclosing a copy of this report, was addressed to the Oquaga Lake Improvement Association.

ROME

ALB

EUGENE H. PORTER, M.D., *State Commissione*

DEAR SIR: — I beg to submit the following
alleged smoke nuisance created by the operati
Rome.

The inspection was made at your directio
Holmquist, Assistant Engineer of this Depart
of a complaint in the form of a petition signe
the vicinity of the plant. The petitioners c
smoke which is emitted from some 13 stacks on
are of insufficient height to properly carry off t

The Merchant Iron Mill is located in the s
has been in operation with more or less regu
since 1868. It was destroyed by fire some 8 yea
the same year.

It appears that the mill which was formerly
Stevens, of Rome, changed ownership about 1½ ye
time the operation of the mill was at no time c
done during the night. Under the new manage
tion of the mill has greatly increased and work is
day for six days in the week.

There are at present 9 puddling furnaces and 5
of the reverbatory type. An extension to the mill
which, when completed, will increase the total nur
to 14 and the heating furnaces to 6. Some 425 men
at present and it is expected that by January 1, 1
sion will be completed, there will be a total of 500 m

The iron mill is engaged principally in manufactu
grade iron from pig iron, scrap iron and ore. About
ucts are produced per day.

The process of manufacture carried on at the plant

Pig iron and about 25 per cent. of iron ore are fi
dling furnaces which are divided into two sections, or
for the metals. It requires about two hours to compl
ess. At certain periods of this operation a very hot s
less fire is maintained while at other stages a smolder
lower temperature and one which will not burn the r
temperature of about 2700 degrees Fahrenheit is reac
furnaces.

When the metal has obtained the required degree o
puddling furnaces it is taken out, rolled into convenient
into comparatively short sections. These pieces are tied
in melting furnaces also of the reverberatory type whe
further refined and welded preparatory to rolling it into f

The firing of these furnaces also produces considerable
by the formation of soot which is produced when the p
gases of combustion come in contact with the cold meta
the slow smoldering and consequently smoky fire which is
sufficient length of time to permit the entire mass of being
without burning the outside portions of the metal which a
flames. This latter process requires about two hours to com

Soft coal, of which some 125 tons are consumed per day,
puddling furnaces and melting furnaces and the rate of con
trolled by dampers and forced draft. The residual gases of
passed through the flues of steam boilers placed above the
the steam used for running the machinery of the plant is gen
in two cases the tops of the smoke stacks from the boilers an
considerably lower than the ridge line of the roof of the pl
pears to cause the smoke to cling to the ground and prevents
quickly dispersed under certain atmospheric conditions.

At the time of the inspection the wind was from a westerly direction and large volumes of smoke occasionally rolled across the canal and practically enveloped the houses located on E. Whitesboro street, directly across the canal and about 150 feet easterly from the plant. Although there are no dwellings located directly south of the plant there are probably some 100 other houses so located northerly and westerly from the plant that the residents would be affected by the smoke from the mill under different atmospheric conditions.

A considerable number of people living near the plant and several business men in the city were interviewed in reference to the smoke nuisance created by the operation of the plant. Most of the people in the vicinity of the mill complained strongly of the inconvenience and annoyance caused by the dense black smoke when the wind is in the direction of their houses at which times it becomes necessary to close all windows in the houses even during the warm weather in the summer.

It was also alleged that the conditions complained of were detrimental to health and that considerable damage to property has been caused by the deleterious effect of the smoke and fumes on paint, tin roofs and roof water leaders as well as on linen and furniture in the houses. It was stated by the complainants that conditions during the past year have been worse than at any time before, principally because under the former management the plant was operated more or less intermittently and no work was done during the night which permitted of windows being opened for ventilation at least during the night even when the wind was from the direction of the mill.

It was also alleged that the main building of the old mill which was burned was not as high as the smoke stacks and the smoke was carried up into the air and was more readily dispersed.

The matter of improving the conditions complained of by improved firing, by raising the main smoke stacks or by carrying the smoke from all the stacks into one high chimney was taken up with Mr. Weston Jenkins, Jr., superintendent of the mill, and although he admitted that smoke from the plant created a serious nuisance he was of the opinion that it would be extremely difficult if not impossible to eliminate the smoke problem.

He explained that especially in the process of manufacturing high grade iron such as is produced by his mill it is impossible to maintain smokeless fires at all stages of the process without burning and thereby spoiling the metal and that it is therefore necessary to maintain a slow, smoldering fire at certain stages of the process which with a highly volatile coal, such as must be used, always produces a black smoke.

With reference to carrying the smoke from all of the furnaces into a single high chimney it was stated by the superintendent that it would be impossible to properly regulate the heat and fires if more than one furnace were connected with a single stack owing to the variable draft produced in a high stack connected with a number of furnaces operated at different temperatures and in each of which it is necessary to change the rate of combustion from time to time during the process of converting the raw material to the finished product.

The superintendent stated that the conditions could probably be remedied somewhat by raising the individual stacks, although he was not sure that much benefit would be derived by so doing. He stated, however, that the proposed stacks for the new additions under construction would be about 30 feet higher than the top of the building and about 90 feet above the ground level. One of these new steel stacks which also had a greater diameter than the old stacks was on the ground and he stated that if it were found upon operation that the installation of high stacks would remedy the objectionable conditions now existing the height of the stacks on the old portion of the mill would be increased.

In conclusion I would state that it appears from the inspection that a serious and objectionable nuisance detrimental to the health and comfort of a considerable number of citizens of Rome is created by the operations of the Rome Iron Mill and that these conditions are due in part if not largely

to the fact that all but two of the stacks of t line of building which prevents the smoke fro air and dispersed. The conditions would in all raising all the existing stacks to a height of would undoubtedly carry the smoke over the adj under ordinary conditions and would also have distant property by reason of the greater disper thereby. It is probable also that the volume of be somewhat if not considerably reduced by more or by the installation of smoke consuming de should also be given careful study and attention

I would therefore recommend that a copy of thi the superintendent or manager of the Rome Iron tion to the serious nuisance and menace to heal operation of their plant and urging that measu abate these conditions at the earliest possible tin also that a copy of this report be transmitted to t of the city of Rome in order that they may be advi exists at the plant and that proper action may be Public Health Law to see that it is properly abated.

Respectfully submitted,

THEO

Copies of this report were inclosed in letters addres chant Iron Mill and to the board of health of Rome, taken to abate the nuisance. Further correspondence i out that the Iron Mill was taking steps toward the abat in accordance with the recommendations of this Depart

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SIDNEY

ALBANY, N. Y., (

EUGENE H. PORTER, M. D., *State Commissioner of Health,*

DEAR SIR: — I beg to submit the following report in r conditions in a portion of the incorporated village of Sidne Delaware county. The inspection was made on October 5 Howland, sanitary inspector, as a result of a complaint to by the Hon. Robert Cartwright.

The inspector conferred with Dr. J. V. E. Winnie, villag regarding the matter and in company with Mr. Cartwrigh locality of which complaint was made. Dr. Winnie stated t had been the cause of complaint for a number of years; tha health had investigated the conditions and while they believe improvements should be made, could not see that they fell wi diction of their board, but should be left for adjustment by th tees and Mr. Cartwright.

The section lies south of the D. & H. and the N. Y., O. & W. It is a residence locality built up with frame houses separat The public water supply is available, but no sewers have yet bee streets although they are shown on plans approved by this De 1893. As a consequence practically all of the houses have outsi

The ground is low and was evidently at one time a marsh whi partially filled as building progressed. To the east and south, rises steeply in a semicircular elevation. Such natural drai curred evidently passed through a stream west of the section. street runs north and south along the foot of the eastern slope an cut through the southern part. Adams street and Sherman avenu

a low grade down toward the west from West Main street through the low area. Adams street lies near the southern curve of the hill and is separated from it by a stretch of low ground increasing in width toward its western end. These streets connect with Union street which runs parallel to West Main street.

There is a considerable run off from the hill into the low area, intercepted on the east by W. Main street while on the south it passes onto low ground south of Adams street. From Main street the surface flow is diverted into Adams street and Sherman avenue. On the former it passes through ditches into the stream above mentioned while on the latter it passes into an inlet giving access to a culvert under the street just west of Main street.

Drainage of the low private property is accomplished through open ditches and drains. In the area between Adams street and the hill an open ditch begins about three-quarters of the length of the block from West Main street and carries the water eastward, connecting with a 10-inch tile drain. On the map submitted to this Department in 1893 a branch of the stream above mentioned is shown in this property and extending about three-quarters of the block from Union street. It appears, therefore, that part of the flow which originally took place in this stream has been diverted the other way, i. e., toward West Main street. The tile drain connecting with the ditch passes northeast across Adams street and empties into an open ditch draining the block between Adams street and Sherman avenue. Its end was about three-quarters full of silt at the time of the inspection. The latter ditch, which is a long established drainage channel, passes westerly through the center of the block to the connection with the above drain, thence northeast and north through the culvert under Sherman avenue turning northwest and then west to a branch of the stream draining the locality. It is grown up with weeds and bushes. Some water stood in it at the time of the inspection and where it passes through the culvert a small stream was flowing.

From inquiries made of Mr. Cartwright and other persons it was determined that in the spring and at times of heavy rain water accumulates on this property, flooding the privies and cellars of several houses. One cellar was entered and by the discoloration of the walls it appeared that a depth of about one foot is sometimes reached. Water stood on the cellar bottom at the time of the inspection.

The soil of the locality, especially on the high portions, is in general sandy and the condition of the streets indicates that it washes easily. Consequently where this surface wash enters the inlet into the culvert through which the ditch passes, some of the silt is deposited. A layer of about two inches of this could be seen at the time of the inspection, the water flowing through it in a narrow stream. The washed condition of the gutter of the streets indicated that the concentration of run-off is rapid. Mr. Cartwright objects to the diverting of the water from Main street into Adams street upon the grounds that its natural course is down and into Sherman avenue below, and also that it tends to increase the deposits in Adams street, necessitating raising the sidewalks. Mr. Cartwright owns a sand bank on the sandy ridge south of Adams street from which he states sand washes into Adams street. He claims that the diversion of water into this street with increased deposit makes it necessary to more frequently clean out these accumulations.

The results of this inspection may be summarized as follows:

1. The locality is a residence section, provided with the public water supply but not sewered, consequently outside privies are used, some of which become flooded in times of freshet. The cellars of several houses also become flooded at such times.

2. A rapid concentration of run-off may be expected from the locality, except the low section where unless adequate egress is provided, the water will accumulate.

3. The drainage of West Main street south of Adams street is provided with a course through the public ditches into the stream naturally draining the locality.

The flat area in which the ditch ends drain
culvert under a partial fill, probably for a road.
the lower end of this culvert at the time of the
be followed through a grove of young trees, a
ditch along the side of the State road fill. Th
masonry and concrete culvert under the road an
flow had increased to a brook of some size, flow

It is shown by the difference in level between
the pond and ditches, that the water in the pond
naturally draining the section, if the upper end
by the fill and the channels were kept open. Th
vegetation and the culverts choked with sand.
erly drain the section, an outlet should not only
made by Mrs. Steers at the lower end of the pon
culvert should be opened and kept clean. It sho
tention of the property owners and to the board o
kayuna that the discharging of wastes into this p
luting of the water by excretal matter without pe
is in direct violation of the Public Health Law.

It is evident that the filling in of the culvert l
way on the property of Mrs. Steers has interfered
of the district and should be corrected by the ope
re-establishment of the drainage conditions exist
the roadway.

I would therefore recommend that a copy of thi
the board of health of the town of Niskayuna an
require the property owner responsible for the int
and established drainage of the section to reopen t

Respectfully subm

THE

Copies of this report were inclosed in letters addre
health and to the complainant. The board of heal
proper action to abate the nuisance and a letter wa
clerk stating that such action would be taken.

OLEAN

ALBANY, N.

MR. THEODORE HORTON, *Chief Engineer, State Depart*
N. Y.:

DEAR SIR: — In accordance with the directions give
January 23, I have investigated, January 29 and
along Olean creek and referred to in communications
president of the local board of health. I found th
follows:

At the mouth of Olean creek there exists a dam abo
and as a result of the existence of this dam, water is
pond in the immediate vicinity of the dam and slack w
cept at the time of floods, for a distance of perhaps
adjacent to the creek are low and must have been at all
flow from the creek, even before the construction of a
also are submerged occasionally, that is, at intervals o
years, because of high water in the Allegany river. T
sufficient to overtop the dam and back up the waters of
the surrounding country.

In spite of the unfavorable topography, the construction of houses in the vicinity of the creek has gradually proceeded and the low lands have, little by little, been partially cultivated and reclaimed until a population, said to be about 500, is living in such a relation to the creek that high water is a menace to their comfort.

The dam is said to have been built in 1857 and to have been in continuous use since that time. The owner of the dam is emphatic in his statement that the height of the dam has not been changed since its original construction and that, inasmuch as the original builder owned some 1,200 acres above the dam, so that the flooding was entirely on his own land, and since all subsequent sales from the original property were made subject to the water rights of the mill property, no suit for damages can lie. The attorney for the complainants, on the other hand, claims that the actual crest of the weir has been raised 33 inches, that flush boards are in constant use, raising the back water two feet in addition. They further claim that at times of high water the head on the weir is at least three feet and is so maintained for several days; whereas by the use of gates duly provided, this damaging head could be prevented and should be prevented since it produces a height of back water in excess of that conveyed in the water right.

It is evident, I think, that these questions are all outside of the Department and that whereas the question of overflowing lands may be construed as a public nuisance, in this case its value as a part of the whole question is so small that it seems to me it can be neglected and the issue squarely joined on the riparian rights question.

There is in addition, however, another question which is more definitely one of public health. It is asserted by the complainants that there are at present discharging into the back water of this dam a number of private and public sewers and because of the presence of the dam the ordinary free fall of the stream is interfered with and therefore the pond, receiving an excess of organic matter, sets up putrefaction and causes most unpleasant and objectionable odors. Apparently, there is no doubt of the fact that odors do arise, at times of low water, from the uncovered swamp areas. Unprejudiced citizens were outspoken in this particular. But whether the odors are those inevitable where swamp land is alternately wet and dry, or whether they are due to the accretions of organic matter artificially introduced, I was not able to determine. At the time of my visit, no odors were perceptible and the stream was running clear and apparently pure below, as well as above, the pond.

It should be noticed that if organic matter is discharged into this stream and pond, it is largely so discharged by those complaining in this case and they ask that the dam be removed in order that they may continue their present method of getting rid of the household wastes without discomfort to themselves and at practically no cost.

The dry weather flow of the creek which has a watershed of about 200 square miles is probably not less than 20 cubic feet per second, a flow ample to prevent a nuisance with a population of 5,000 draining into it at any one point in a concentrated flow.

It may also be pointed out that certain persons have acquired and own property in the vicinity of the creek which would be valuable land for vegetable gardens if danger from flooding could be averted. It is said, by way of illustration, that one person, a comparative stranger in the community, bought 20 acres or so, and after thorough cultivation and planting was on the point of reaping his harvest, when high water in August flooded the land a foot or more deep for ten days, thereby causing the loss, he claims, of $5,000. Except for the fact that such pecuniary losses follow high water and except that it is believed by the owners of property subject to overflows, that the removal of the dam would lessen such danger, I do not believe that the danger to health would have been pressed. I cannot but think that, generally speaking, the individuals complaining of conditions are, so far as health is concerned, largely responsible for those conditions themselves, and that if their wastes were properly cared for, there would be no ground, on

the score of health, for asking for the remov
local board of health was acting wisely whe
matter of public health. It might be possil
of the better sanitation in this particular
measure, buy the mill dam and the water ri
the stream and perhaps dike the bank. It m
as a public health measure this will comme
and the common council may provide the n
I cannot feel, however, that it is now so in
require any action of the local board of hea
Your

Subsequent to the above investigation and r
to the Department and further corresponden
formal hearing was held at the Department c
ferent parties interested were present or repre

The following report was submitted on March

ALB

EUGENE H. PORTER, M.D., *State Commissioner*

DEAR SIR: — In accordance with your request
report upon the conditions of Olean creek abo
referred to you by the local authorities and m
by the engineering division.

Following the hearing in your office on Mar
careful consideration to the facts, opinions and
time as well also to the information and data b
assistant engineer, secured during his inspection
dam which he was directed to make and which
under date of January 31, 1912, and have been
definite opinion concerning the conditions which
relations which these conditions bear to the heal
munity and of the extent and limitations of autho
may have with respect to any action that might
rect any existing objectionable conditions.

The various facts and factors involved in the
been presented and carefully discussed not only
reports of Professor Ogden, and without entering
of them I will present at once what may in my
the salient facts in connection with the case and
ing them as follows:

1. That a dam was built many years ago
junction with Allegany river which so raises
ordinarily considerable areas of land adjacent

2. The height and usual operation of dam i
siderable areas to very shallow depth during low
duce objectionable conditions with respect to
creation of odors at certain seasons of year, a
flood heights of waters above the dam at other
objectionable conditions and possibly damage
vicinity.

3. That there is no evidence presented or avai
narrowing of waterways by railroad embankme
measure responsible for this excessive flooding
that the back water from the Allegany river is n
cause to account for much or most of the floodi
the dam, at least for what might be considered

4. That the people of Olean who reside adja

a low grade down toward the west from West Main street through the low area. Adams street lies near the southern curve of the hill and is separated from it by a stretch of low ground increasing in width toward its western end. These streets connect with Union street which runs parallel to West Main street.

There is a considerable run off from the hill into the low area, intercepted on the east by W. Main street while on the south it passes onto low ground south of Adams street. From Main street the surface flow is diverted into Adams street and Sherman avenue. On the former it passes through ditches into the stream above mentioned while on the latter it passes into an inlet giving access to a culvert under the street just west of Main street.

Drainage of the low private property is accomplished through open ditches and drains. In the area between Adams street and the hill an open ditch begins about three-quarters of the length of the block from West Main street and carries the water eastward, connecting with a 10-inch tile drain. On the map submitted to this Department in 1893 a branch of the stream above mentioned is shown in this property and extending about three-quarters of the block from Union street. It appears, therefore, that part of the flow which originally took place in this stream has been diverted the other way, i. e., toward West Main street. The tile drain connecting with the ditch passes northeast across Adams street and empties into an open ditch draining the block between Adams street and Sherman avenue. Its end was about three-quarters full of silt at the time of the inspection. The latter ditch, which is a long established drainage channel, passes westerly through the center of the block to the connection with the above drain, thence northeast and north through the culvert under Sherman avenue turning northwest and then west to a branch of the stream draining the locality. It is grown up with weeds and bushes. Some water stood in it at the time of the inspection and where it passes through the culvert a small stream was flowing.

From inquiries made of Mr. Cartwright and other persons it was determined that in the spring and at times of heavy rain water accumulates on this property, flooding the privies and cellars of several houses. One cellar was entered and by the discoloration of the walls it appeared that a depth of about one foot is sometimes reached. Water stood on the cellar bottom at the time of the inspection.

The soil of the locality, especially on the high portions, is in general sandy and the condition of the streets indicates that it washes easily. Consequently where this surface wash enters the inlet into the culvert through which the ditch passes, some of the silt is deposited. A layer of about two inches of this could be seen at the time of the inspection, the water flowing through it in a narrow stream. The washed condition of the gutter of the streets indicated that the concentration of run-off is rapid. Mr. Cartwright objects to the diverting of the water from Main street into Adams street upon the grounds that its natural course is down and into Sherman avenue below, and also that it tends to increase the deposits in Adams street, necessitating raising the sidewalks. Mr. Cartwright owns a sand bank on the sandy ridge south of Adams street from which he states sand washes into Adams street. He claims that the diversion of water into this street with increased deposit makes it necessary to more frequently clean out these accumulations.

The results of this inspection may be summarized as follows:

1. The locality is a residence section, provided with the public water supply but not sewered, consequently outside privies are used, some of which become flooded in times of freshet. The cellars of several houses also become flooded at such times.

2. A rapid concentration of run-off may be expected from the locality, except the low section where unless adequate egress is provided, the water will accumulate.

3. The drainage of West Main street south of Adams street is provided with a course through the public ditches into the stream naturally draining the locality.

4. North of Adams street the verted into Sherman avenue, ent
5. Private ditches and drains e whose object is to provide a mea
6. The outlet of these ditches tioned culvert to a ditch beyond, draining the locality.

From the above inspection it appea run-off on the public streets should be not injure private property and that property should have open channels should be cared for by the village auth in the case of the inlet in Sherman a vert probably impede to a slight extent draining the private property above it. the diverting of water from West Mai is the most direct course into the st and it does not appear that if the dit property will be injured in any way. prevent the washing of sand from his sa obvious that the flow or run-off in the

The ditch draining the low private p in Sherman avenue is grown up with obstruct the flow of water through it. south of Adams street appears to have b westward to flow eastward into the ditc the culvert the ground is also flat, grow would not flow through it readily. At t of silt in the culvert would not impede has progressed the ground areas of this what more impervious, the concentratio present channels for carrying off the w flooding of the low section is probably du both above and below the culvert; to the adequate size than to obstruction in the

I would recommend, therefore, that the erty owners whose property is affected b to take proper steps to provide adequate accumulating on the property. This coul ing out the present channels, providing ditches and culvert to insure a rapid flo other materials, which obstruct the flow, c

I would further recommend that a cop the village authorities and to the compla follow out at once the recommendation co

Respectfully sub

Letters, inclosing copies of this report, w of trustees, the local board of health and t

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SYRACUS

EUGENE H. PORTER, M.D., *State Commission*

DEAR SIR: — I beg to submit the followin an alleged nuisance caused by the operation pany, situated in the town of Dewitt, nea quarters of a mile east of the city of Syrac

The inspection was made at your direction as the result of a complaint received by this Department on May 1, 1912, in the form of a petition signed by some seventy-five residents in the vicinity of the plant of the Syracuse Rendering Company. The petition stated that a nuisance is maintained by this company due to the discharge of refuse from their plant into the Erie canal and that the odors therefrom are noticed as far as the city of Syracuse.

The records of this Department show that the matter of the operation of the Syracuse Rendering Plant has been the subject of a number of inspections made by representatives of this Department during the past year as the results of complaints received from different sources. The location of the plant with reference to the surrounding country, its operation and method of caring for the wastes from the plant have been fully discussed in previous reports and will be reviewed briefly.

Early in the month of June, 1911, Dr. Thomas Foreman, Deputy Health Officer at Syracuse, called the attention of the Department to the pollution of Headson creek, a tributary of Ley and Bear Trap creeks, which flows through dairy farms supplying milk to the city of Syracuse, caused by the discharge of wastes and sewage from the Syracuse Rendering Plant, the roundhouse of the N. Y. C. & H. R. R. in East Syracuse and from the village of East Syracuse.

An inspection of the conditions along this stream was made by a representative of this Department and a report was submitted to you under date of June 30, 1911, setting forth the results of this inspection and making recommendations that the matter of removing the pollution of the stream be taken up with the Syracuse Rendering Company, with the board of health of the village of East Syracuse, and with the bureau of health of the city of Syracuse, which recommendations were subsequently carried out.

It was found at that time that the domestic sewage from the plant of the Syracuse Rendering Company was discharged into a cesspool which did not appear to overflow and that the only trade wastes discharged from the rendering plant into Headson creek consisted of water used for chilling the fats and the wash water used in washing the floors in the edible department and that the Syracuse Rendering Co. were at that time proposing to install, under the direction of the board of health of the town of Dewitt, a filter to treat such wastes.

On June 29, 1911, a petition was received at the Department signed by 200 residents of East Syracuse and the town of Dewitt, protesting against the maintenance of a public nuisance caused by the operations carried on at the plant of the Syracuse Rendering Co. and at the building formerly owned by the Farmer's Fertilizer Co.

The report of the chief engineer, dated September 2, 1911, based on the inspection made by Mr. W. Gavit, show that the following means were taken at the rendering plant to prevent the escape of odors, gases and vapors:

1. Raw material from the rendering department is handled quickly so that little offense can be due to the decomposition of this material before it is disposed of.

2. The material is fed into the digestors, located on the fourth floor, which are closed and the cooking is done by steam under pressure.

3. The gases and steam from the digestors go to a suction tee on the fourth floor where a flow of water carries the steam into a closed iron tank called a deodorizer which discharges into the Erie canal through a submerged pipe.

4. Four hoods are in position over the bone cooking vat, bone washer and barrel washer for the purpose of conveying the vapors and gases from these vats to the ventilator flume on the roof, at the end of which is placed a 12-foot fan which draws the odors and vapors from the building and forces them to the bottom of an adjacent tower used as a condensing tower. This tower, which is about 12 feet by 14 feet in cross section, is about 65 feet high and is filled for a distance of about 40 feet

from the top with a checker work of wooden
at the top of the tower and passes down ov
of condensing and taking up the gases and
the tower from the bottom.

This tower, however, was not in operation at
Mr. Gavit on August 30 and 31, 1911, and ch
plant could be noticed by him at a distance of
this inspection the Syracuse Rendering Company
to abate the nuisance which then existed.

On January 29 Mr. S. A. Thayer, one of the
ceived on August 29, 1911, discussed the matter wit
ing which another inspection of the Syracuse Ren
your direction by Mr. H. B. Cleveland, principal
Department. It was found during this inspection t
which was not in operation at the time of the prev
placed in operation in the early part of October, 19
ing improvements had been made at the plant since

1. A dynamo of 20 h. p. had been purchased
put in position on the fourth floor to operate th
power for running the plant was shut off, whic
night.

2. A new fan had been installed and put in ope
1911, to replace the old fan used up to that time.

3. A new duct for the purpose of caring for the
tank in the cellar had been installed and carri
building.

4. A duct had been constructed from the dryers
the flume on the top of the building which conne
and condensing tower.

Steps were also being taken by the company at that
arrange the flume from the fan to the bottom of the con
to leave no right angle turns and no constricted sections
a side wall hood on the third floor back of the nine
arrest the steam and vapors from the pipe connections of
arise from the second to the third floor, there being f
tween the floors near the digestors.

The recent inspection which was made by Mr. C. A. H
engineer of this Department, on May 8, 1912, in company
and the superintendent of the plant, showed that all the i
at the time of the former inspection had been made and
and that the contemplated rearrangement of the flume fr
bottom of the condensing tower noted by Mr. Cleveland h
pleted. Satisfactory results from this new arrangement
obtained inasmuch as no offensive odors could be noticed
condensing tower and no disagreeable odors from the plant
except in close proximity to it at the time of the inspection
hood referred to above, however, had not been installed but
the manager that steps to do so had been taken by him and t
in operation within four weeks of the time of the inspectio
improvements completed and other minor changes made it is
the odors from the plant will be cared for in a satisfactory

With respect to the discharge of refuse from the plant i
through the submerged outlet it was found that the overfl
deodorizer through which the gases and steam from the digestors
condenser water from the evaporators and water from the cond
are being discharged into the canal. Although the digestors
quently the deodorizer, were not in operation at the time of th
the water from the condensing tower and from the evaporator
discharged into the canal, no offensive odors could be noticed n

high temperature type in thickly populated districts of municipalities without creating a nuisance.

Which of the acceptable and successful methods of garbage and refuse disposal used in municipalities at the present time would be the most satisfactory to adopt from a sanitary and economical standpoint could only be decided upon after a local study of all of the factors involved, such as costs of different types of furnaces, the available sites for disposal, etc. These points, of course, could not be determined in the necessarily brief inspection which it was possible for this Department to make and should be undertaken by the board of public works.

I would therefore recommend that copies of this report be sent to the complainant and to the commissioners of public works and public safety, and that they be advised to take proper steps to provide for a more efficient, sanitary and satisfactory means of disposal of garbage, refuse and dead horses.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the commissioner of public safety of Yonkers and to the complainant. It was requested that steps be taken by the city to abate the insanitary conditions then existing.

In addition to the foregoing, nuisances were examined into in some cases and advice was given through correspondence in other cases in the matter of abatement of nuisances at the following places:

Akron
Albany
Albion
Allegany
Amenia
Arlington
Ashland
Auburn
Aurora
Avon
Babylon
Bath
Bellmore
Brighton
Bronxville
Brunswick
Canajoharie
Caroline
Carthage
Castleton
Catskill
Central Square
Chappaqua
Cohoes
Corning
Cornwall-on-Hudson
Coxsackie
Dannemora
Dayton
Dunkirk
East Syracuse
Elmira
Elmira (Town)
Fishkill
Fort Edward (Town)
Franklinville
Fremont
Freeport
Freeville
Fulton
Gates (Town)
Glen Cove
Gouverneur
Greenburg
Greenport
Greenwood Lake
Groton
Harlemville
Harrison
Hastings-on-the-Hudson
Haverstraw
Hawthorne
Hempstead
Hornell
Hudson
Indian Lake
Jamestown
Lake Placid
Larchmont
Lawrence Park
Le Roy
Lewiston
Ludlowville
Lyons Falls
Marlboro (Town)
Mechanicville
Monroe
Monticello
Moravia
Mt. Vernon
Nelliston
Newark
New Berlin
New Rochelle
Northport
North Tonawanda
Old Forge
Oneonta
Ossining
Palmer Falls
Peekskill
Penn Yan
Phillipstown (Town)
Plainview
Pleasantville
Port Byron
Port Henry
Port Jefferson
Poughkeepsie
Prattsburg
Randall
Rensselaer
St. Johnsville
St. Regis Falls
Salamanca
Saratoga Springs
Sharon Springs
Sherburne
Sloan
Solvay
Southeast (Town)
Suffern
Summitville
Tannersville
Tennanah Lake
Troy
Tuxedo (Town)
Unionville
Warwick (Town)
Watertown
Waverly
Wawarsing (Town)
Westfield
Whitehall
Wilson
Wolcott

I would further recommend that a copy of this report be submitted to the board of health and to the board of trustees and that the local boards be requested to take action along the lines recommended.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the local board of health, to the village board of trustees and to the complainant. The village authorities were urged to carry out the recommendations contained in this report and to abate the nuisance complained of at an early date.

YONKERS

ALBANY, N. Y., *July* 8, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — I beg to submit the following report of an inspection of the garbage and dead animal crematory with special reference to the method of disposal of dead horses, in the city of Yonkers, which was made at your direction as the result of complaints received from Mr. George N. Rigby, attorney at law of Yonkers, representing a number of residents in the vicinity of the crematory, alleging that a nuisance is created by the operation of this plant.

It was stated by the complainant, among other things, that the crematory, which was built many years ago, does not have sufficient capacity to properly dispose of the garbage and dead animals of the city without creating a nuisance in the neighborhood of the plant and that some 200 families are affected thereby. It was also alleged that dead horses are allowed to lie within an adjacent enclosure for a period of from four to five days after the removal of the skins from the animals and before they are disposed of at the crematory.

The city crematory is located between Iselin street and Parsons street extended some 300 or 400 feet from the Saw Mill river road and geographically not far from the central portion of the city. Although this location was probably in a sparsely settled section of Yonkers when the crematory was constructed some 19 years ago, the section is now developed considerably and there are at present some 200 houses within a radius of about one-quarter of a mile of the plant. One two-family house is situated within 200 feet of the crematory and a number of houses are within 400 feet of it.

According to data published by Wm. F. Morse in his book on the "Collection and Disposal of Municipal Wastes," the crematory was constructed in 1893 by J. McKay and has a rated capacity of 25 tons in 24 hours. The crematory, which is similar to the Engle crematory, is a rectangular brick structure about 30 feet long and is provided with a primary and secondary fire box between which the cell for burning the garbage is placed.

Anthracite coal is used for fuel and the fire boxes, gratings and dampers are so arranged that, under normal operating conditions, the fire and gases of combustion from the primary fire pass over the drying grates to the secondary fire and then the combined fires and gases pass under the drying grates before reaching the smoke stack which is located near the primary fire box. This stack consists of a brick base and steel stack having a total height of about 75 feet. No artificial or forced drafts are used in connection with the furnace.

The crematory is covered with a frame building and inclined wooden approaches lead up to the charging floor over the combustion chamber. The garbage is dumped directly from the garbage collection wagons into the drying grates through 3 circular openings, one of which is sufficiently large to admit the carcass of a horse. The garbage is discharged into the cremator as soon as or shortly after it arrives at the crematory, and no garbage is stored in the building, which appeared to be maintained in a sanitary condition and no offensive odors could be noticed on the charging floor. Characteristic odors due to imperfect combustion of garbage and gases of combustion were noticed, however, in line with the smoke and vapors from the stack.

high temperature type in thickly populated districts of municipalities without creating a nuisance.

Which of the acceptable and successful methods of garbage and refuse disposal used in municipalities at the present time would be the most satisfactory to adopt from a sanitary and economical standpoint could only be decided upon after a local study of all of the factors involved, such as costs of different types of furnaces, the available sites for disposal, etc. These points, of course, could not be determined in the necessarily brief inspection which it was possible for this Department to make and should be undertaken by the board of public works.

I would therefore recommend that copies of this report be sent to the complainant and to the commissioners of public works and public safety, and that they be advised to take proper steps to provide for a more efficient, sanitary and satisfactory means of disposal of garbage, refuse and dead horses.

Respectfully submitted,
THEODORE HORTON,
Chief Engineer

Copies of this report were inclosed in letters addressed to the commissioner of public safety of Yonkers and to the complainant. It was requested that steps be taken by the city to abate the insanitary conditions then existing.

In addition to the foregoing, nuisances were examined into in some cases and advice was given through correspondence in other cases in the matter of abatement of nuisances at the following places:

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Brighton
Bronxville
Brunswick
Canajoharie
Caroline
Carthage
Castleton
Catskill
Central Square
Chappaqua
Cohoes
Corning
Cornwall-on-Hudson
Coxsackie
Dannemora
Dayton
Dunkirk
East Syracuse
Elmira
Elmira (Town)
Fishkill
Fort Edward (Town)
Franklinville
Fremont
Freeport
Freeville
Fulton
Gates (Town)
Glen Cove
Gouverneur
Greenburg
Greenport
Greenwood Lake
Groton
Harlemville
Harrison
Hastings-on-the-Hudson
Haverstraw
Hawthorne
Hempstead
Hornell
Hudson
Indian Lake
Jamestown
Lake Placid
Larchmont
Lawrence Park
Le Roy
Lewiston
Ludlowville
Lyons Falls
Marlboro (Town)
Mechanicville
Monroe
Monticello
Moravia
Mt. Vernon
Nelliston
Newark
New Berlin
New Rochelle
Northport
North Tonawanda
Old Forge
Oneonta
Ossining
Palmer Falls
Peekskill
Penn Yan
Phillipstown (Town)
Plainview
Pleasantville
Port Byron
Port Henry
Port Jefferson
Poughkeepsie
Prattsburg
Randall
Rensselaer
St. Johnsville
St. Regis Falls
Salamanca
Saratoga Springs
Sharon Springs
Sherburne
Sloan
Solvay
Southeast (Town)
Suffern
Summitville
Tannersville
Tennanah Lake
Troy
Tuxedo (Town)
Unionville
Warwick (Town)
Watertown
Waverly
Wawarsing (Town)
Westfield
Whitehall
Wilson
Wolcott

INVESTIGATIONS ORDERED BY THE GOVERNOR

authorities to enforce the rules and carry out the recommendations of this Department.

As a result of this epidemic the Department, though limited by authority to compel an enforcement of the rules and regulations, started a campaign to induce the local authorities to correct the conditions upon the watershed and to install a filter plant for a purification of the water and the protection of the public health of the citizens. These efforts of the Department resulted in the stirring up of public opinion to the point of authorizing the construction of a filter plant and a modern plant of high efficiency was installed and has since 1910 been in operation. Repeated analyses by the water company and by this Department show that the water furnished Peekskill is very efficiently purified by this filter plant and ranks in purity with the best supplies in the State.

Since the installation of the filter plant no specific complaints were received by the Department until October, 1911, when some alleged violations in the vicinity of Oscawana lake were reported to the health officer, Dr. J. H. Jenkins of the town of Putnam Valley. As a result of this complaint an inspection was made by this Department with reference to these violations and the matter was at once referred to the board of water commissioners with recommendations that they take immediate steps to abate the conditions under the rules and regulations. Owing to the installation and operation of the filter plant at this time the water as delivered to the citizens of Peekskill was shown to be thoroughly purified and to be practically free from contamination. In fact the establishment of this filter plant put an entirely different phase upon the water supply problem in Peekskill and made very much less important the question of a strict enforcement of the water rules than prior to the installation of this plant.

Early in 1912 a request was received from the water commissioners of Peekskill asking for an amendment to the rules and regulations by lessening the restricting distances of certain classes of pollution. The request was based upon the highly efficient type and operation of the present water purification plant, which, as analyses had shown, was removing practically all of the objectionable bacteria in the water. As a result of this request an inspection of the watershed was made and an amendment to the rules was prepared and enacted by me on April 12, 1912.

About one month after the application of the water commissioners requesting an amendment to the water rules was received a complaint was made to the Department by the local board of health making a general statement that violations existed upon the watershed and determined by a personal inspection of Mr. Bucher, member of the local board of health. No specific cases were mentioned. Mr. Bucher was advised of the law in regard to the matter; that the enforcement of the rules was in the hands of the board of water commissioners and not under the authority of the local board of health; that all violations reported to the Department had been properly verified by this Department in accordance with the Public Health Law and the necessary notices issued; that the Department had under advisement the question of amendment to the water rules, and that the results of the analyses indicated that the filter plant was doing excellent work and furnishing a water of high purity to the citizens of the village.

Since this amendment to the rules and regulations and this correspondence with members of the local board of health with reference to the water supply, no complaints have been received by the Department either in regard to violations of the water rules or concerning the purity of the water as supplied to the citizens of Peekskill. As a result of the amendment to the water rules it is my understanding that no violations exist in the vicinity of Oscawana lake, and furthermore, owing to the efficient type and operation of the municipal filter plant, the water now supplied the citizens of Peekskill, as shown by analyses, ranks with the purest supplies of the State.

Trusting that the above report answers fully your inquiry, I beg to remain,

Very respectfully,

EUGENE H. PORTER,

Commissioner of Health

used for canal facilities, is now largely abandoned for that purpose, although some craft were anchored in the lower section below Lloyd street. Its disuse is probably due in part to its present offensive condition. Its ownership by the State apparently ceased when the portion between Main street and Commercial slip was sold by parcels at auction by the State in 1908 and 1910 to Kirby, Brown, Wolff and others, and, so far as could be learned, some of those parcels have passed into the hands of subsequent purchasers.

Although the consideration of corrective measures to remove the nuisance now existing is somewhat beyond the scope of this investigation it would seem obvious that the only effective and permanent remedies are the removal of the sewage now discharging into this "slip" through the large covered drain at Main street and the extending of this drain to Commercial slip, and filling in of the slip. The somewhat complex condition of the system of sewerage of this district would, it seems to me, make it difficult to abate entirely the nuisance by attempting only the removal of the sewage now discharged into the storm channel, for much of it would be difficult if not impracticable to remove, and furthermore, there would still remain street wash and storm overflows which would intermittently discharge offensive material into the "slip."

For these reasons it would seem that both of these measures, the removal of sewage so far as possible, and the extension of the drain and filling in of "slip," might be necessary to effectually remove the nuisance now existing. The application of these measures may involve careful legal considerations. They will necessarily involve careful engineering considerations. I am of the opinion, however, that the remedy is, from an engineering and practical standpoint, possible and that it should be applied at the earliest possible time.

In conclusion, therefore, I beg to state that as a result of this investigation and after due consideration of the facts and information obtained I hereby find and certify that there exists in and about this "slip" in the city of Buffalo, running from Main street to Commercial slip, a public nuisance in the nature of unsightly floating sewage matters and offensive odors arising from the drainage and sewage discharged therein through the large covered drain entering this "slip" on the west side of Main street and that this nuisance affects the health and comfort of a considerable number of persons who live along or use as thoroughfares the streets in this vicinity.

Very respectfully,
EUGENE H. PORTER,
Commissioner of Health

PEEKSKILL

ALBANY, N. Y., *October* 23, 1912.

Hon. JOHN A. DIX, *Governor of the State of New York, Executive Chamber, Capitol, Albany, N. Y.:*

DEAR SIR: — I beg to acknowledge receipt of your letter of October 22, 1912, with reference to the Peekskill water supply and in accordance with your request I beg to submit the following report:

The Peekskill water supply is one of some seventy-five water supplies of the State which are protected by rules and regulations enacted by the State Department of Health. The rules and regulations controlling the water supply of Peekskill were enacted in 1897 and provided for the protection of the watershed of the supply against pollution, but the enforcement of them under the law rests with the local authorities.

In 1907 and 1908 complaints were received by the Department that the rules were not being enforced by the local water company and it was about this time that the Department made an investigation of the conditions upon the watershed and reported to the local authorities a number of violations which should be corrected at once by them in accordance with the Public Health Law. These advices were not heeded and an epidemic of typhoid fever soon followed due clearly to the omissions on the part of the local

INSPECTION OF RENDERING PLANTS

BARREN ISLAND

2621 Grand Ave., New York City, *December* 31, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — There are three companies operating as many plants on Barren Island at the present time and rendering all the garbage, dead animals, and offal from the five boroughs of Greater New York city. Two of these companies have comparatively new concrete and brick plants. A fourth plant formerly used to make commercial fertilizer has been shut down all year.

The largest plant is that of the New York Sanitary Utilization Co., which handles all the garbage collected by the New York street cleaning department. During the past year this has amounted to 382,990 tons. All the buildings at this plant used in rendering garbage are of concrete and brick construction. Sanitary conditions have been satisfactory on the whole, especially in view of the extensive alterations which have been carried on without seriously interfering with the work. These alterations which will not be completed for several months yet, are going to improve sanitary conditions considerably, especially in so far as they affect offensive odors. Steam presses have been substituted for the old hydraulic presses and the garbage passes from the cooking tanks, to the receiving tanks, and to the steam presses, where it is pressed before coming into contact with the outside air, and all gases generated in these processes are carried under the boilers before being liberated. New dryers and screens have been installed which with covered conveyors materially reduce the dust nuisance.

The Thomas F. White Co. has handled an average of a little over 125 tons daily or about 50,000 tons for the year of garbage which it collects from the big hotels of Manhattan and Brooklyn. This plant is old and of frame. Its facilities are far in excess of the requirements of its present uses, however, so that it is not difficult to keep it in a good sanitary condition.

The Products Manufacturing Company has a concrete and brick plant and handles all the dead animals, offal, etc., and in addition, renders fish. Its receipts for the past year have been: Horses, 19,012; cows, 390; sheep, 112; hogs, 136; calves, 1,213; goats, 84; offal, including dogs and cats, 4,442,290 pounds; fish, 741,350 pounds. The receipts of horses and fish have been considerably below former years and at no time have either been received in excessive quantities. This has contributed largely to the excellent sanitary condition which has prevailed at this plant.

While conditions at all three plants throughout the year have been generally satisfactory it has been necessary to make innumerable recommendations and in some cases actual complaints in order to maintain a good sanitary condition. As a rule conditions complained of have been promptly rectified, and the inclination of the companies is to do what they can to help the work of the State Department of Health. The fact that Barren Island is isolated, standing in the middle of Jamaica bay, a half mile from the nearest shore, prevents it from being a real nuisance to the general public.

JOHN R. EUSTIS,
Inspector

CHEEKTOWAGA

BUFFALO, N. Y., *December* 31

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany,* N

DEAR SIR: — The American Agricultural Chemical Co. (Milsom has received and handled in the past year the following material:

	I
Tallow	
Bone	
Grease	
Offal	
Tankage	
Fish	
Blood	
Total	

Horses	
Cattle	
Hogs	
Sheep	
Calves	
Carcasses	
Total	

The only expense they had in the past year for extra improve for repairs to keep their plant up in good condition.

Their equipment consists of a battery of 10 rendering tanks; all t from the 10 tanks are assembled and condensed by means of an el submerged tank; the condensation is very complete in eliminati pleasant odors.

They have 4 fire dryers in batteries of two; each battery leads tower which condenses the vapors; the scrub towers in turn are co a 150-foot smoke stack. All their other equipment is much the s the past.

Their plant is now in fine shape and good running order and I any cause for complaint.

As is customary, their wagons have been washed and disinfected load during the summer months.

The Baynes Garbage Reduction Company has been entirely clo the whole year, the Buffalo Fertilizer Company handling all the g

The Buffalo Fertilizer Company has not done as much in the business as in previous years; they have received and rendered i year the following material:

Hogs	
Sheep	
Calves	
Cattle	
Horses	
Total	

In their reduction plant they have handled and disposed of 8,74 green garbage, these running about 5 yards to the load.

They are using 7 tanks in disposing of their material as they ca satisfactorily with that number.

They have not expended anything for extra improvements in the past year other than that necessary to keep their plant in good condition.

Their works and the grounds surrounding them have been kept in first class shape and the inside of the works have been kept in fine condition by the constant use of whitewash and disinfectants.

All the machinery and dryers have been kept in the best of shape and have been able to handle all the material received at the plant almost immediately upon arriving.

They also washed and disinfected their wagons after each load during the summer months.

I have made regular visits to both the plants and always found them running in good shape and there has been little cause for complaint and think that everything has been very satisfactory to everybody concerned for the past year.

Yours obediently,
JOHN T. CLARIS,
Inspector

ROCHESTER TALLOW COMPANY

ROCHESTER, N. Y., *December* 31, 1912.

Hon. EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — The work at the Rochester Tallow Company has progressed rather satisfactorily this year, there being an evident desire on the part of the superintendent, Mr. Haag, to obey any rules which have been laid down and also to follow out any suggestions which might be made.

There still remains, however, the fact that no practical means has yet been devised of eliminating the fly nuisance which has been mentioned in my previous reports.

I would also suggest that better drainage for the court yard between the two buildings be instituted in the coming year and thus avoid collection of filth — horse refuse, etc., which increases the attraction for the flies.

While not strictly within my duties as inspector, yet something which is of exceeding value to the public at large, I have also mentioned in my previous letters or reports; namely, the necessity for the inspection of meats which are slaughtered and stored by this plant. Under present conditions any sort of cattle can be slaughtered, and those which do not pass the Jewish test are sold to the Gentiles. In the matter of storage, the proprietors of the plant are not at fault as they merely store meat for those who have it slaughtered as they do not do the slaughtering for themselves.

It is possible, without meat inspection, for meat unfit for human food to be stored and disposed of by the owners of the meat.

In the general conduct of the plant I believe that inspection has improved conditions and that during the past year things have been maintained in as satisfactory a manner as one would expect in this line of business.

Attached, please find a copy of the report of the Tallow company of their activities during the past year.

REPORT OF ROCHESTER TALLOW CO., 1912

The company has two separate buildings, one given to the slaughtering of cattle, calves and lambs and the storing of the meat for wholesale butchers of Rochester. The other is given to the rendering of fats derived from such work, along with that purchased from the retail markets of the city.

The work for the year 1912 is as follows:

Slaughter House	Head
Cattle killed	11,607
Calves killed	4,948
Lambs killed	4,929

Tallow Plant

Tallow rendered	
Tankage	
Dried blood	
Skin bones cleaned	
Hoofs and horns	

Purchased from Retail Markets

Market fat	
Slaughter house fat	
Bones	
Suet	
Scraps, etc.	

MONTGOMERY I

SPECIAL INVESTIGATIONS

SANITARY INSPECTION OF SUMMER RESORTS

The work of investigating the sanitary conditions at summer hotels and boarding houses were carried on during 1912 as extensively as reduced appropriations available for this purpose would permit. There is perhaps no line of activity in the Department work more important in some respects to the protection of public health and more fully warranted by the results accomplished than the protection of the recreation public through the supervision of the sanitary condition of summer resorts. It is believed that this work should be extended rather than curtailed for much ground still remains to be covered in this field of work.

In March, 1912, letters were addressed to the proprietors of some 328 summer resorts investigated during 1911, calling their attention to certain insanitary conditions at their hotels and requesting that steps be taken to correct such conditions. The original inspection of 122 of these resorts had been made in 1910 and the letters sent constituted second notices to remedy insanitary conditions at these places. The original inspection of the other 206 resorts had been made during the season of 1911, the total number of resorts inspected for the first time during that year being 304.

These 328 resorts were located at widely different points, the investigation having progressed so far that there were represented all but one of the thirteen districts into which the State has for convenience in carrying out the work been divided.

These districts are as follows:

I. Thousand Islands — St. Lawrence district.
II. Fulton Chain — Big Moose district.
III. Raquette, Tupper and Long Lakes district.
IV. Saranac — St. Regis district.
V. Lake Champlain district.
VI. Lake George district.

VII. Lake Pleasant — Saratoga Springs district.
VIII. Western district.
IX. Central — Finger Lakes district.
X. Otsego Lake — Richfield Springs district.
XI. Catskill — Albany district.
XII. Southern district.
XIII. Long Island district.

It is unfortunate that lack of appropriations preclud spection during the season of these 328 resorts in order mine what steps had been taken to carry out the recomm of the Department and that the progressive work of th ment in the investigation of additional summer resorts be continued. Notwithstanding this, however, a person gation of a general nature was made by the Commiss two members of his staff, of sanitary conditions along t Chain of Lakes and the St. Lawrence river. As a resu inspection notices were issued in November to the pro every summer resort in the Adirondacks along the Fult and in the adjacent districts where it appeared from inspections that sewage was still being discharged untr lakes and streams, such notices requiring that before th of the coming season provision be made for satisfactory of sewage.

INSPECTION OF CITY WATER SUPPLIES

The experience of the Department in the work of investigating the sanitary conditions of cities was discussed in my last annual report, and it was shown that in the case of twelve of the twenty-one cities whose sanitary condition was carefully examined into from 1907 to 1910, the recommendations made concerned principally the public water supply.

It was by reason of the outcome of the general investigation of sanitary conditions of cities undertaken during the years 1907 to 1910 inclusive, and in order to extend the work in the direction of accomplishing the greatest good in the shortest time, that, beginning with 1911 and continuing through 1912, these special investigations of cities were limited largely to a careful review of the sanitary features connected with the public water supplies. The work of investigation included in each case a careful study of vital statistics with respect to all features and conditions having a bearing on the public health but with special reference to the sanitary quality of the public water supply and the effect on the mortality rate which the quality of the supply might be responsible for.

Such investigations and studies have now been completed of the following cities:

Batavia
Glens Falls
Gloversville
Jamestown
Little Falls
North Tonawanda
Olean
Oneida
Plattsburg
Rome
Tonawanda

In each case reports have been prepared and transmitted to the public health and city officials reviewing fully all phases of the public water supply with respect to its sanitary quality and making recommendations for improvement where insanitary conditions were found.

VII. Lake Pleasant — Saratoga Springs
VIII. Western district.
IX. Central — Finger Lakes district.
X. Otsego Lake — Richfield Springs di
XI. Catskill — Albany district.
XII. Southern district.
XIII. Long Island district.

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Figure No. 1

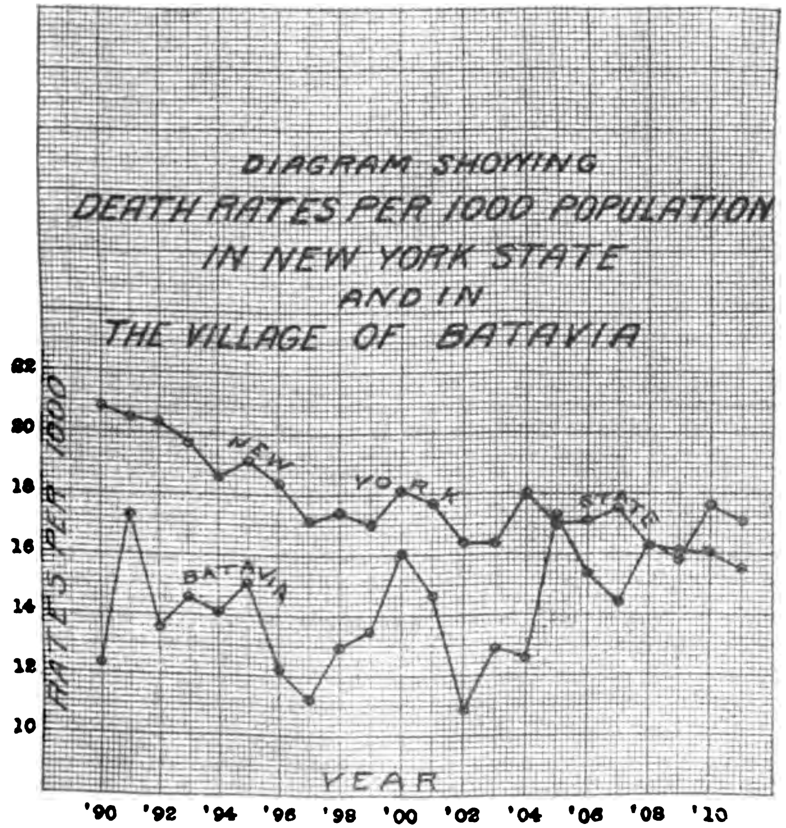

DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE VILLAGE OF BATAVIA
RATES PER 1000
22
20
18
16
14
12
10
NEW YORK STATE
BATAVIA
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

INSPECTION OF RENDERING PLANTS
BARREN ISLAND

2621 Grand Ave., New York City, *December* 31, 1912.

EUGENE H. PORTER, M.D., *State Commissioner of Health, Albany, N. Y.:*

DEAR SIR: — There are three companies operating as many plants on Barren Island at the present time and rendering all the garbage, dead animals, and offal from the five boroughs of Greater New York city. Two of these companies have comparatively new concrete and brick plants. A fourth plant formerly used to make commercial fertilizer has been shut down all year.

The largest plant is that of the New York Sanitary Utilization Co., which handles all the garbage collected by the New York street cleaning department. During the past year this has amounted to 382,990 tons. All the buildings at this plant used in rendering garbage are of concrete and brick construction. Sanitary conditions have been satisfactory on the whole, especially in view of the extensive alterations which have been carried on without seriously interfering with the work. These alterations which will not be completed for several months yet, are going to improve sanitary conditions considerably, especially in so far as they affect offensive odors. Steam presses have been substituted for the old hydraulic presses and the garbage passes from the cooking tanks, to the receiving tanks, and to the steam presses, where it is pressed before coming into contact with the outside air, and all gases generated in these processes are carried under the boilers before being liberated. New dryers and screens have been installed which with covered conveyors materially reduce the dust nuisance.

The Thomas F. White Co. has handled an average of a little over 125 tons daily or about 50,000 tons for the year of garbage which it collects from the big hotels of Manhattan and Brooklyn. This plant is old and of frame. Its facilities are far in excess of the requirements of its present uses, however, so that it is not difficult to keep it in a good sanitary condition.

The Products Manufacturing Company has a concrete and brick plant and handles all the dead animals, offal, etc., and in addition, renders fish. Its receipts for the past year have been: Horses, 19,012; cows, 390; sheep, 112; hogs, 136; calves, 1,213; goats, 84; offal, including dogs and cats, 4,442,290 pounds; fish, 741,350 pounds. The receipts of horses and fish have been considerably below former years and at no time have either been received in excessive quantities. This has contributed largely to the excellent sanitary condition which has prevailed at this plant.

While conditions at all three plants throughout the year have been generally satisfactory it has been necessary to make innumerable recommendations and in some cases actual complaints in order to maintain a good sanitary condition. As a rule conditions complained of have been promptly rectified, and the inclination of the companies is to do what they can to help the work of the State Department of Health. The fact that Barren Island is isolated, standing in the middle of Jamaica bay, a half mile from the nearest shore, prevents it from being a real nuisance to the general public.

JOHN R. EUSTIS,
Inspector

is therefore not creditable to the
while in both the State as a whol
rate is declining, due undoubtedly
a more thorough appreciation of t
in Batavia is as high or higher in
spite of the lack of anything ap
or those conditions causing the s
in both cases is above that of the
With respect to typhoid fever,
Table 2 shows the population of t
and the death rates per 100,000 p
and shows these rates plotted
York State. It has been found t
quite possible in cities where pr
quality of the water and milk su
United States, to maintain a typho
not unreasonable to expect that ra
progress gains further headway.
deaths from typhoid fever in Bata
maximum number, with one death
Therefore, should any number of de
be cause for alarm and for greater
of health.

By referring to Table 2, it will
twenty-two year period, one death oc
below 15 and therefore eminently satis
only are to be found, the rates then b
number which should be permitted.

TABL

Showing the Population, the Number of
Death Rate per 100,000 *Populatio*
Years 1890 *to* 1911 *Inclusive*

YEAR
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
Average

Figure No. 2

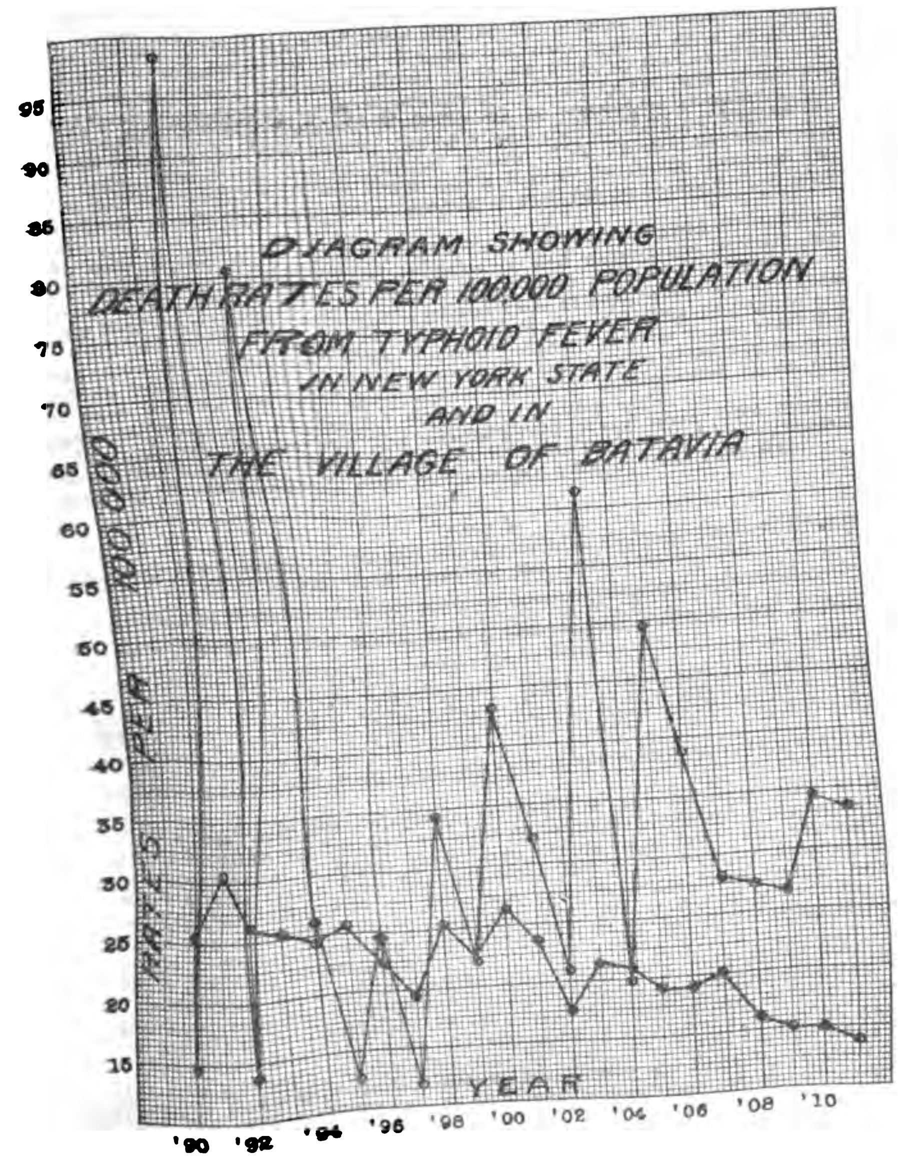
DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE VILLAGE OF BATAVIA
RATES PER 100,000
YEAR
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

In the other thirteen years, the number of deaths varied from three to seven, the last figure approaching the condition of an epidemic.

It is to be remembered that each death from typhoid fever corresponds usually to about ten cases of illness so that an increase from two deaths to seven deaths means not merely the loss of the five lives indicated but also serious illness on the part of some fifty of the citizens of Batavia. It is customary to estimate the value of a life lost from typhoid fever at $5,000 and the accompanying cases of illness at $5,000 more, so that each death is a loss to the community to be approximately valued by the sum of $10,000. If we assume that the number of deaths can be reduced by two deaths per year on the average, the money saving would then be held at $20,000 per year — the interest on half a million dollars. This amount Batavia could afford for improving sanitary conditions if it could be shown that such improvement would prevent the occurrence of such future excesses of typhoid fever.

It may be said very properly that the recent improvement in sewerage will decrease the probability of pollution of well water since hereafter the wastes of the houses will be carried away from their vicinity instead of being held in cesspools and in the ground close at hand where the pollution of wells is more likely. On the other hand, it may definitely be pointed out that since this ground pollution has been going on now for many years the sudden introduction of a sewer system will not at once eliminate dangers of past pollution and the sewer system should be supplemented by an adequate supply of pure water not taken from polluted earth.

In order to demonstrate the possibility of lower rates from typhoid fever than have been shown of late in Batavia, Table 3 has been prepared showing the death rates in some of the larger cities of New York State.

TABLE 3

Showing Death Rates per 100,000 Population from Typhoid Fever in Certain Cities of New York State, for the Years 1904 to 1910

CITY	1904	1905	1906	1907	1908	1909	1910
New York	16.9	15.8	15.5	17.4	12.8	12.7	11.6
Rochester	15.2	10.5	16.2	14.3	11.6	8.6	13.7
Syracuse	14.7	14.5	9.2	11.6	15.2	11.1	27.5
Binghamton	9.6	12.0	9.1	18.2	15.2	13.1	13.4

In a small city the tabulation of statistics and the inferences to be drawn therefrom are not as conclusive as in larger cities since the addition or subtraction of a single death may change materially the conclusion which may be drawn from the statistics. But in the case of Batavia the repetition year after year of three, four and five deaths from typhoid fever would seem to show without danger of error that such a large number of deaths is not accidental and that the high rate is due to local conditions which should be investigated.

In the State as a whole the efforts of the sanitary authorities and the greater appreciation of sanitary truths is shown by the gradual reduction in the typhoid fever death rate. In 1891 this rate was 30.3 and in 1911 it was 13.9, a reduction of more than one-half in twenty years and a reduction which has been gradually accomplished year by year. The curve for the State in Figure 2 shows this marked downward tendency. In Batavia, however, no such downward tendency can be noted and a comparison of the two curves shows that the rate in Batavia is generally higher than that of the State, with an upward rather than a downward tendency. Except for the two high death rate years, 1891 and 1893, this upward tendency is plainly to be seen. In the nine years, 1894 to 1902, inclusive, the average rate was 25.4 and in the

succeeding period, 1903 to 1911, the rate was 35.5 – higher than in the former period. Again, in this latt toward high death rates is more persistent and in tl number of deaths has not been below 3. This increase i with no years in which the normal number is found alarming feature of the study of the typhoid fever stati that for some reason there is in Batavia a marked fai respond to those influences which are, in other parts o reducing the typhoid fever death rate.

The cause of typhoid fever has generally been found water or infected milk. Recently, also, much stress has b in southern States, on the possible transmission of the infected material in drains or privies or polluted streams without further investigation to say to which of these ally large number of deaths and presumably the many of typhoid fever in Batavia have been due and it must l health authorities to so examine the local conditions, roundings of the residences, the character of the milk di quality of the water supply as to be sure that they have caution to prevent a further recurrence of an excessive disease and if possible to reduce the amount now existi be found that the deaths reported do not result from diseas Batavia, but, on account of peculiar hospital facilities, brought in from the surrounding country or from the railroa of course, no accompanying cases of illness will be found in the previous history of the cases would determine the loca fection is likely to have occurred.

The use of well water in a community where the subsoil long time the receptable of human wastes is always a pote phoid fever and it may be that an investigation would show those afflicted with this disease have been accustomed to d kind of water. The fact that the public water supply is n luted, as will be shown later, makes it unnecessary to look cause of typhoid fever in Batavia unless it is known that th not used for drinking purposes by those attacked by the dise properly be pointed out, however, that probably the majority of Batavia are also far from safe insofar as their quality is con

Turning to the deaths of children under five (see Table 4), it that while the average death rate at that age per 10,000 popula there are many years in which that rate is much lower. The in the United States and also in Massachusetts and in New Yo not far from 50 per 10,000, so that Batavia with a rate of 27.1 i normal, and, insofar as these figures indicate the health of the Batavia is better off than the State as a whole. This rate, how proper interpretation, should be based not upon the total popu upon the number of children under five years old, since manifestl jority of the population are adults, the death rate of children would be low in comparison merely because of the small number among the total population. Thus in Austria, where the birth rat 35, the deaths of children under five were in a certain year 46 pe all the deaths, while in France where the birth rate is 21, the children were only 23 per cent. In Batavia in 1910, the birth 18.4 and in 1911 it was 20.6, the average rate among the cities of of approximately the same population being 19.0, showing that ther abnormal conditions in Batavia insofar as the birth rate is concer that therefore there should be an average number of children am total population.

In the last six years in New York State, the ratio of deaths under total deaths has ranged between 27.3 per cent. and 27.9 per cent., a little more than one-quarter of all the deaths were under five ye Table 5 shows the total number of deaths, the number of deaths und and the percentage of the latter to the former in Batavia for the la

years and, although none of the percentages are as high as the normal of the State, there is a marked constant increase from 1907 onward. This is most serious and the tendency here indicated should cause the local authorities to make immediate inquiry into the cause of these advancing rates. It is always significant to find a high death rate among children since they are particularly susceptible to organic impurities in water and in milk, to impure or tainted food and to crowding together in unventilated rooms.

TABLE 4

Showing the Population, the Number of Deaths of Children Under Five Years and the Death Rate per 10,000 *Population in the Village of Batavia,* 1890–1911 *Inclusive*

YEAR	Population	Number of deaths under 5 years	Death rate per 10,000 population
1890	7,000	17	24.3
1891	7,110	18	25.3
1892	7,221	26	36.0
1893	7,465	24	32.2
1894	7,710	14	18.2
1895	7,955	34	44.1
1896	8,200	22	26.5
1897	8,445	17	20.1
1898	8,690	16	18.4
1899	8,935	15	16.8
1900	9,180	28	30.5
1901	9,360	21	22.4
1902	9,540	20	21.0
1903	9,720	30	30.8
1904	9,900	19	19.9
1905	10,080	28	27.7
1906	10,386	26	25.0
1907	10,692	26	24.3
1908	10,999	28	25.5
1909	11,306	38	33.6
1910	11,613	38	32.6
1911	11,959	50	41.8
Average	....	....	27.1

TABLE 5

Showing the Total Number of Deaths, the Number of Deaths Under Five Years and the Percentage of the Latter to the Former in Batavia for the Years 1907 *to* 1911 *Inclusive*

YEAR	Total deaths	Number of deaths under 5 years	Per cent.
1907	154	26	17.0
1908	181	28	15.5
1909	179	38	21.2
1910	204	38	19.0
1911	204	50	24.5

One of the greatest casual factors in infant mortality is that group of disorders classified as diarrhea and enteritis. In the registration area of the United States in 1910, 28 per cent. of the children under one year are recorded as having died of these diseases. About 85 per cent. of all the deaths in this group occurs in children under two years of age and it is generally conceded that certain etiological factors not bacterial in nature are

largely responsible for the prevalence of these infan influence of climate upon enteritis is acknowledged a is well understood to be a summer disease. The ra the negro population and of certain classes of immi the death rate also. But perhaps the most important lence of enteritis is the well known influence of th cities and of the results of woman labor in mill and fa part is also due to milk and water impurities and if the enteritis due to water and milk, we should have from that disease a very fair index of any city's sanit tainly a city which is too small to have slums and v good water supply has a high enteritis rate, has, in all tary conditions which are not essentially different from large cities, at least in their effect upon infant mortal

Table 6 shows the death rate from diarrhea and enteri in Batavia for the past five years and it is to be noted t rate has been above 50.0 although in 1907 it was only 2

TABLE 6

Showing the Death Rate from Diarrhea and Enteritis Ur Batavia for the Years 1907 to 1911 Inclus

YEAR	Population	Nu deat dis *ent*
1907	10,692	
1908	10,999	
1909	11,306	
1910	11,613	
1911	11,959	

TABLE 7

Showing the Average Death Rates per 100,000 from Typhoid Enteritis in Michigan Cities, with Notes as to the Wate 1910

CITIES	Typhoid fever	Enteritis	W
Escanaba	136.	185.	Pollute
Sault Ste. Marie	52.3	134.6	Good
Alpena	46.7	162.6	Pollute
Ironwood	43.5	124.5	Doubtf
Port Huron	42.	78.6	Pollutec
Flint	43.	63.	Pollutec
Traverse City	42.	53.5	Pollutec
Bay City	37.3	56.3	Polluted
Lansing	33.3	56.6	Good
Battle Creek	31.3	44.	Doubtfu
Kalamazoo	29.5	50.	Good
Jackson	28.3	45.5	Good
Muskegon	24.7	50.8	Doubtful
Saginaw	24.6	42.	Wells saf
Pontiac	24.5	44.	Good
Ann Arbor	22.1	18 6	Good
Manistee	20.8	48.	Good

For comparison, the following table from a bulletin of the U Public Health and Marine Hospital Service, written by Dr.

Loughlin, gives the death rates from typhoid fever and from enteritis in the Michigan cities, with notes as to the water supply. The three cities at the end of the list, Pontiac, Ann Arbor and Manistee, which have a good water supply, have low rates from both typhoid fever and enteritis; also Lansing, Kalamazoo and Jackson are marked as having good water supplies, although the death rates would indicate either a questionable quality of water or of some other insanitary conditions.

In Batavia in 1911, the enteritis death rate of 81 per 100,000 suggests vividly the dangerous possibilities of the present conditions of sanitation in Batavia and the possible outcome of the health of the village if these tendencies are not checked. Unfortunately, time did not permit the inspector to remain in Batavia long enough to follow up the indications here made and to determine the actual cause of the high rates here given. It will be necessary for the local authorities to consider by locality each specific death and determine, if possible, the cause of such death. Thus, by comparing conditions in 1911 and in 1907 and weighing the effect of changes responsible for the increased number, it may be possible to take such steps as shall prevent any further increase in the deaths of children so significant in the estimation of the sanitary condition of the city.

So far as could be learned, the city has no conditions of drainage or of living which will, by superficial examination, account either for the sporadic epidemics of typhoid fever or for the upward tendency of the curve showing the deaths from children's diseases. It would seem, however, that there must be present in Batavia conditions which have interfered and are still interfering with the lowering of death rates from preventable diseases, this tendency being notably present in the State as a whole. It would seem also that there must be present in the city, not under full control by the sanitary authorities, conditions which cause unquestionable and sporadic variations in the death rates from typhoid fever and from diarrhea and enteritis. It is manifestly the duty of the health authorities to determine the cause of these variations and to take such steps as shall bring them under control.

Water Supply

The water supply of Batavia is taken from Tonawanda creek at a point near the center of the village. A dam about eight feet high has been thrown across the creek and from the pond thus formed the water is pumped directly to the consumers. The water works are in the hands of the municipality and the water consumed is about 2,000,000 gallons per day, or nearly 200 gallons per head per day. The Pumping plant consists of two steam pumps, the discharge being directly connected into the distribution mains.

There are a number of small villages above Batavia on Tonawanda creek as at Dale (pop. 180), Linden (pop. 200) and West Bethany (pop. 57) on the east branch. On the west branch are the villages of Attica (pop. 2,000), Varysburg (pop. 500), Johnsonburg (pop. 250) and Perry (pop. 320). More or less pollution must reach the stream from these villages. There is also considerable pollution within the limits of Batavia itself.

The water is recognized by the citizens as being unfit to drink and is used only for fire and laundry purposes supposedly. It is understood that the drinking water and water for other domestic purposes is taken altogether from wells. The analyses which have been made of the public water supply of Batavia are of the polluted water from Tonawanda creek and do not represent in any sense the drinking water of the village. Thus the presence of typhoid, if that disease is to be accounted for by the impurity of the drinking water, would be shown not by the analyses herein given but rather by analyses from the wells of the village.

The soil conditions in Batavia are such as would naturally be conducive to wide distribution of pollution, since the ground water lies near the surface, since the soil particles are coarse and since, up to the present, the only methods of disposing of house refuse was through the agency of cesspools.

The analyses made by the Department of Health are given in Table 8 and show what one would assume from the topographical and local conditions.

TABLE 8

Report of Analyses of the Batavia Public Water Supply

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	3-9-09	2-12-10	2-14-10	5-28-10	2-25-11
Color	9.	19.	19.	10.	15.
Turbidity	40.	12.	12.	10.	25.
Total solids	188.	356.	356.	385.	202.
Loss on ignition	41.	210.	210.	214.	57.
Mineral residue	147.	146.	146.	171.	145.
Nitrogen as —					
Free ammonia	.042	.042	.042	.008	.028
Albuminoid ammonia	.342	.068	.068	.064	.040
Nitrites	.003	.004	.004	.002	.003
Nitrates	0.60	0.60	0.60	0.10	0.50
Oxygen consumed	2.70	2.50	2.50	2.10	2.60
Chlorine	3.37	4.	4.	3.25	3.75
Total hardness	124.	122.8	122.8	145.8	120.
Alkalinity	103.	119.	119.	145.	116.
Bacteria per c.c.	2,600.	13,000.	13,000.	1,700.	2,500.
B. coli type —					
10 c.c.	Present	Present	Present	Present	Present
1 c.c.	Present	Present	Present	Present	Present
1/10 c.c.	Present	Absent	....	Absent	....

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	4-12-11	7-15-11	9-26-11	12-11-11	1-15-12	3-1-12
Color	20.	30.	25.	10.	10.	10.
Turbidity	160.	1.	30.	30.	15.	18.
Total solids	399.	239.	277.	151.	232.	179.
Loss on ignition	110.	41.	36.	17.	28.	22.
Mineral residue	289.	198.	241.	134.	204.	157.
Nitrogen as —						
Free ammonia	.004	.194	.004	.026	.042	.020
Alb. ammonia	.096	.160	.164	.080	.038	.102
Nitrites	.001	.015	.003	.001	.001	.001
Nitrates	1.00	Trace	0.04	0.40	0.60	0.70
Oxygen consumed	6.70	3.70	3.70	2.69	1.10	2.60
Chlorine	3.25	12.87	3.	4.	4.62	3.50
Total hardness	180.	180.	182.	126.	160.	106.
Alkalinity	96.	161.	165.	78.	152.	100.
Bacteria per c.c.	2,800.	6,200.	5,200.	22,500.	550.	9,000.
B. coli type —						
10 c.c.	Present	Present	Present	Present	Present	Present
1 c.c.	Present	Present	Present	Present	Present	Present
1/10 c.c.	....	Present	Present	Present	Present	Present

Thus, the nitrogen found as ammonia is variable and at times high. The nitrates vary from trace to 1 part per million. The oxygen consumed value is always high and the chlorine is excessive for surface water in this part of the State. Most conclusive of all, however, is the fact that the bacterial count is always high and that intestinal forms of the B. coli type are always present, even in samples as small as 1/10 c.c. The water is not fit to drink and the analyses merely establish scientifically what is generally known to be the fact.

Conclusions

1. Batavia is a busy manufacturing village on the level plain between Rochester and Buffalo. No marked congestion of population was noted nor were any conditions of uncleanliness observed which are likely to affect the death rate.

2. The general death rate is low and generally below the average of the State. During the last six years, however, the rate has been rising and during the last three years has been higher than in the cities of

the State. The tendency, therefore, in recent years is upward rather than downward, in marked distinction to the State as a whole.

3. The death rate from typhoid fever is intensely irregular, with rates as high as 98.5 in one year and as low as 11.8 per thousand in another year. Although two deaths per year from typhoid fever should, in view of its population, be considered a maximum for Batavia, in thirteen of the twenty-one years considered more than this number of deaths are to be found. The fact that the death rate is so generally higher than the rates of the State is, or should be, a cause for alarm among those responsible for the good health of the city.

4. The death rates among the young children are apparently low, indicating with the low general death rate the apparent healthfulness of the city, except within the last few years. With the deaths of children as with the general death rate, the tendency is upward, the percentage of deaths under five to total deaths having risen from 17 to 25 in the last five years.

5. The death rate from diarrhea and enteritis in the last five years is high and vividly emphasizes the dangerous possibilities of the present-day conditions of sanitation in Batavia.

6. The water supply comes directly from the Tonawanda creek and the appearance of the water, the analyses of the State Hygienic Laboratory and the practice of the people of Batavia, all indicate the insanitary quality of the water for domestic use. It is asserted that the creek water is used only for domestic flushing, laundry and fire purposes and that none of it is used for drinking. If this be so then the water-borne typhoid must be entirely due to well water and the conditions of subsoil in Batavia would make such a source of typhoid fever well within the reasonable range of possibilities.

Recommendations

1. It is recommended that the local board of health, acting under sections 21 and 24 of the Public Health Law, shall duly consider the prevalence of typhoid fever and of children's diseases in Batavia with a view of determining if possible the cause of the present excess over the normal for the State and of reducing the death rate from these diseases to lower values.

2. It is further recommended that the board of water commissioners take steps to provide for the village a water supply which is available for all domestic purposes. The method of securing such a supply may not properly be considered here but it may properly be pointed out that a public water supply which may not be used for drinking is inadequate and unsafe and obliges citizens to have recourse to wells the quality of the water in which is certainly open to suspicion.

Respectfully submitted,
H. N. OGDEN,
Special Assistant Engineer

Copies of this report were sent to the board of water commissioners and to the other village authorities.

FULTON

ALBANY, N. Y., *October* 7, 1912.

MR. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — In the matter of the quality of the public water supply of the city of Fulton, N. Y., I have to report as follows:

Source of Supply. The source of the municipal supply is a series of four wells or springs, known as springs Nos. 1, 2, 3 and 4. Of these, No. 4 is the most distant from the city and the highest in elevation and, with No. 3 only

about one hundred feet distant, is on the Keeler pro as Keeler springs.

No. 1 is connected directly with the pump and ac which the other waters drain. No. 3 is about one the 1, and is under practically identical conditions. The 1 is pumped into a standpipe erected on a knoll imm pump house, and flows from there to the city by grav

Development of Springs. In development, the spri case, presumably, there was evidence of a natural flow f similar to springs now to be seen in the vicinity of Ful developed or exploited. For the purposes of the wate protected and improved by sinking a sheet steel casin diameter and twelve feet deep around the spring and r the inside. Since the surrounding soil has been found ings have been put down with difficulty and in the case yet connected, the casing is badly twisted and torn as its original circular plan. These casings are bottomles riveted plates and the sides are not watertight after b tion, even if they were made so originally. A stream c spring No. 1, making its way through the steel casing lines of rivets.

Vicinity of Springs. Springs Nos. 1 and 2 are in flat, tween the highway and the river, about a mile south of immediate vicinity of spring No. 1 has been improved ground raised, but No. 2 stands with swamp, intersper reaching almost up to the steel casing. No levels are a elevation of this swamp area, but it is understood that at in the Oswego river adjoining, the river water overflows t extends to the immediate vicinity of the wells. It is said the water been up high enough to overflow the top of th covered with wooden planking.

About two miles south of the city line are the other sp higher ground and a quarter of a mile east of the river. the flood waters of a small stream which separates the free from danger of surface pollution.

Typhoid Fever in Fulton. Statistics indicate an undu phoid fever in Fulton and the following table (Table 1) the past fourteen years as reported by the division of vit

TABLE 1

Showing the Population, the Number of Deaths from Typh Death Rate per 100,000 Population in the City o

YEAR	Population	I ty
1898	7,950	
1899	8,078	
1900	8,206	....
1901	8,334	
1902	8,462	
1903	8,590	
1904	8,718	
1905	8,847	
1906	9,173	
1907	9,499	
1908	9,825	
1909	10,151	....
1910	10,480	
1911	10,890	

There are, to be sure, banner years without a single death from typhoid fever as in 1900 and 1909 and there are other years as in 1902 and 1910 when only one death occurred during the year. With the population of Fulton, one death a year is perhaps a reasonable number, the rate per 100,000 population being from 9 to 12. In four other years, however, there were two deaths, in two others three and in different years four, five and even eight. Out of the fourteen years, therefore, there are four years in which the rate was below fifteen per 100,000 and eleven in which the rate was above fifteen, the latter being a fair and reasonable ideal for such a city as Fulton. In trying to account for such high rates, it is natural to turn to the water supply, since experience teaches that it is to polluted water that typhoid fever is generally to be attributed.

Analyses of Water. The Hygienic Laboratory has made many analyses of the water supply of Fulton during the past two years and the following table (Table 2) gives the data obtained. Two points of interest are to be noted.

A — The character of the water as obtained from a tap in the city is quite different from the water found in springs Nos. 3 and 4. Thus, *first*, mineral residue in the springs varies from 44 to 125, while the mineral residue in the public supply varies from 269 to 497. *Second*, the free ammonia in the springs varies from .004 to .026 while the free ammonia in the public supply varies from a trace to .014.

TABLE 2

Analyses of the Fulton Public Water Supply for the Years 1910 *and* 1911

(Results are in parts per 1,000,000)

Collected on	1-18-10	4-21-10	5-2-10	5-26-10	6-28-10
Color	Trace	2	2	3	Trace
Turbidity	Clear	Clear	Clear	Clear	Clear
Total solids	360	405	425	417	409
Mineral residue	277	305	265	294	298
Nitrogen as —					
Free ammonia	Trace	.002	.004	.008	.010
Albuminoid ammonia	.006	.002	.042	.024	.012
Nitrites	.001	.001	.001	.001	.002
Nitrates	0.04	0.30	1.00	0.70	0.60
Oxygen consumed	0.31	1.10	0.20	1.70	1.20
Chlorine	108.	126.	116.	120.	72.
Total hardness	160.	212.	146.	208.	134.
Alkalinity	....	....	100.	98.	106.
Bacteria per c.c.	35.	55.	140.	75.	25.
B. coli type					
10 c.c.	Absent	Absent	Present	Present	Absent
1 c.c.	Absent	Absent	Absent	Present	Absent
1/10 c.c.	Absent	Absent	Absent	Absent	Absent

Collected on	9-20-10	11-16-10	12-28-10	2-18-11	4-8-11
Color	Trace	Trace	5	Trace	Trace
Turbidity	Clear	5	Clear	5	Clear
Total solids	539.	406.	443.	425.	389.
Mineral residue	359.	286.	343.	268.	346.
Nitrogen as —					
Free ammonia	.014	.004	.004	.006	.004
Albuminoid ammonia	.036	.022	.022	.014	.038
Nitrites	.001	.012	.003	.001	Trace
Nitrates	0.24	1.50	0.40	0.80	0.30
Oxygen consumed	0.57	0.70	1.81	0.80	6.80
Chlorine	144.5	109.	130.	135.	139.
Total hardness	140.	134.	293.	229.	146.
Alkalinity	93.	108.	100.	109.	110.
Bacteria per c.c.	10.	1,400.	375.	140.	800.
B. coli type					
10 c.c.	Present	Present	Absent	Present	Absent
1 c.c.	Absent	Absent	Absent	Absent	Absent
1/10 c.c.	Absent	Absent	Absent	Absent	Absent

TABLE 2 — *Continued*

Analyses of the Fulton Public Water Supply for the Y

(Results are in parts per 1,000,000)

Collected on	6-1-11	9-7-11
Color	Trace	
Turbidity	Trace	Clea
Total solids	414.	753.
Mineral residue	324.	497.
Nitrogen as —		
Free ammonia	.008	.006
Albuminoid ammonia	.018	.034
Nitrites	.001	Trace
Nitrates	0.80	0.30
Oxygen consumed	0.90	0.60
Chlorine	110.	195.
Alkalinity	94.	94.
Total hardness	236.	182.
Bacteria per c.c.	10.	250.
B. coli type		
10 c.c.	Absent	Present
1 c.c.	Absent	Present
1/10 c.c.	Absent	Absent

Third. The albuminoid ammonia in the springs varies while the albuminoid ammonia in the public supply varies

Fourth. The nitrates in the springs vary from 0.80 to trates in the public supply vary from 0.04 to 1.50.

Fifth. The chlorine in the springs varies from 2.5 to 4, in the public supply varies from 72 to 195.

Sixth. The bacterial count in the springs on one occasion vember 15, 1910); on another was 230; but, excluding these for seven samples, while in the public supply on one occasio 1,400, on two others 375, but, excluding these two, averages

Seventh. Bacteria of the colon type are found in the sp times out of seven samplings and then only in 10 c. c. sample found in the public supply in 1 c. c. samples four times and in eight times out of sixteen.

In view of the presumption that the underground stream springs naturally take their water is the same within this comp area and in view of the striking differences of composition, pa chlorine and as to mineral residue, it seems probable that the w the city is not pure spring water but is modified or changed either in the pump well (well No. 1) or in well No. 2.

B — Analyses of the Oswego river water at Oswego show a larity to those of the public water supply at Fulton and have ference from the analyses of springs 3 and 4. Thus, the mine the river (Analyses Oswego Public Water Supply 1910) range 577, the nitrates from .04 to .20 and the chlorine from 76 to 19 ity in the case of the chlorine and the mineral residue being re

Methods of Infiltration. In view of the character of the wat 3 and 4 and in view of the presence of other flowing springs b river, it seems unquestionable that there is a broad stream or sl flowing underground from east to west and presumably dischar Oswego river. The elevation of this stream, since it produces flo about river level, is greater than that of the river under normal c that the overflow from the springs flows over the surface of the the river. Under such circumstances no pollution of the spring fr could occur. But when water is pumped from the well so that below that of the river, any channel of communication would allow to drain to the well, the amount varying with the relative levels of in the well and river. Evidently the difference in level of the two creases as either the well is pumped down or as the river level ris

Corroboration of Infiltration. In order to see whether the records of analyses showed any analogy or dependence on the stage of the river, the records of the barge canal office for the mean daily elevation (Barge Canal Datum) for 1910 and 1911 of the Oswego river above Oswego Falls dam at Fulton have been plotted on the diagram attached to this report. There have also been plotted to the various scales indicated certain of the analytical data, the dates of the analyses, corresponding to the records of the river gaugings. It will be noted that in both years there is a flood stage of the river in March or April and a low stage in July. In 1910, the drought of the summer was prolonged, except for a slight break in November until December 19 while in 1911 the fall rains began early in August. In 1910, the wells were naturally kept pumped down through the summer and fall, the ground water being low as well as the river. In 1911, on account of summer demands the wells were pumped down while the river level was nearly two feet high.

Comparing the variations of chlorine with the river stage, it is seen that the May 2 amount is less than the April 21 amount, presumably because the ground water flow was high and in spite of the high river stage the difference was not great. In September, however, the draught on the wells being greater and the ground water flow less, the proportion of river water increases and the chlorine value rises from 72 in June to 145 in September. Similarly in 1911 the minimum chlorine value is 110 in June and 195 in September.

The mineral residue shows similar changes which are equally significant if it is remembered that the mineral residue in the springs is from 50 to 90 and in the river from 270 to 550. In April, 1910, when the chlorine was low and the drain on the river evidently least, the mineral residue was 265, and in September, when the drain was greatest, the amount was 352. In 1911, these amounts were 346 and 497, respectively. The nitrates, shown in red on the diagram, being higher in spring water than in the river water, causes a variation in the opposite direction, that is, the nitrates in the water pumped from the well are high in May and June and lowest in September. The ammonia does not seem to possess any characteristic properties of either river or spring water and, therefore, does not give any additional evidence.

In view of these considerations and remembering the occasional outbreaks of typhoid fever, it is believed that the evidence in favor of a possible infiltration of the river water into the well is sufficient to justify action on the part of the water board of the city of Fulton for the purpose of withdrawing springs 1 and 2 as a water supply for the city. The fact of the gross pollution of the Oswego river is so well known as to require no comment. The villages of Phoenix and Baldwinsville and the city of Syracuse all discharge raw sewage into the river and analyses of the water at Oswego invariably show the presence of fecal organisms. Either a watertight pump well, into which the waters from springs 3 and 4 and perhaps from other springs, can be led, should be built or the pump house should be moved to the vicinity of springs 3 and 4 and the lower springs abandoned.

Respectfully submitted,
HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the city board of health and to the other city authorities.

GLENS FALLS

ALBANY, N. Y., *April* 10, 1912.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on the sanitary condition of the city of Glens Falls, particularly as affected by the quality of the water supply. The visit to Glens Falls on which this report is based was made in August, 1911, and the studies of statistics have been made and the report written during February, 1912.

The city of Glens Falls lies on a level area o Hudson river about eight miles south of Lake Ge north of Albany. The river at this point has a with other falls immediately below, and the theor of development, even at periods of low water, is 5(attracted industries chiefly of the paper-making an large mills are in evidence along the banks of th consist of saw mills, shirt and collar factories, lime

A branch of the Delaware and Hudson railroad r to the south end of Lake George and connects at main line between Troy and Montreal. The canal State dam just above Glens Falls through the city in 6 miles to the east. The general elevation of the above the river at Troy and 10 miles to the north side of Lake George rise from 1,500 to 1,800 feet. southerly also west of Glens Falls and it is from tl known locally as Luzerne mountain, that the water obtained.

According to the 1910 census Glens Falls had a pop was thirtieth in rank among the 49 cities of the State ance of a wideawake manufacturing center and the na mercially which is due to the water power is likely responsible for an increased rate of growth and a development.

For some years the city has had a sewer system w present cost the city $177,000 bonded indebtedness. practically the whole city and the sewage therefrom is d into the Hudson river. A considerable pollution of the wastes of the pulp factories, takes place so that the se sewage is practically concealed. The nearest city downstr does not take its water supply from the river and the ri drinking purposes until the city of Albany is reached.

Vital Statistics

The general death rate for the past 22 years (1890–191 which is apparently not high when compared with the r Thus, in 1910 the death rate for the State as a whole was 16 the same rate as in Glens Falls, on the average for two for the ten-year period, 1900–1910, the average rate for the and for the ten-year period preceding was 18.6, both higher Falls rate. But the State as a whole includes both country lation and for comparison with Glens Falls we may properly rate in other cities. The average death rate of the cities State for the past 10 years (1900–1909) is 17.3, which, a than the average rate for Glens Falls. It would therefo justifiable to claim that, insofar as it can be determined by a rate, the sanitary condition of Glens Falls compares favor State and with other cities of the State. But a more detaile figures unhappily leads to other conclusions.

Table 1 gives the population, the number of deaths and tl per 1,000 population in Glens Falls for the period 1890–191 shows the rates plotted graphically with similar rates for tl whole for comparison. Two characteristics are to be noted: the curve for the State is a smoother curve with fewer violent than that for the city. This is, to be sure, partly accounte much greater population of the State, so that excess rates in counterbalanced by low rates in another. But formerly the c State showed the same irregularities that now appear in the Such differences as are found in the Glens Falls rates in the (rate, 20.8), 1903 (rate, 12.8) and 1911 (rate, 19.3) are in

Figure No. 1

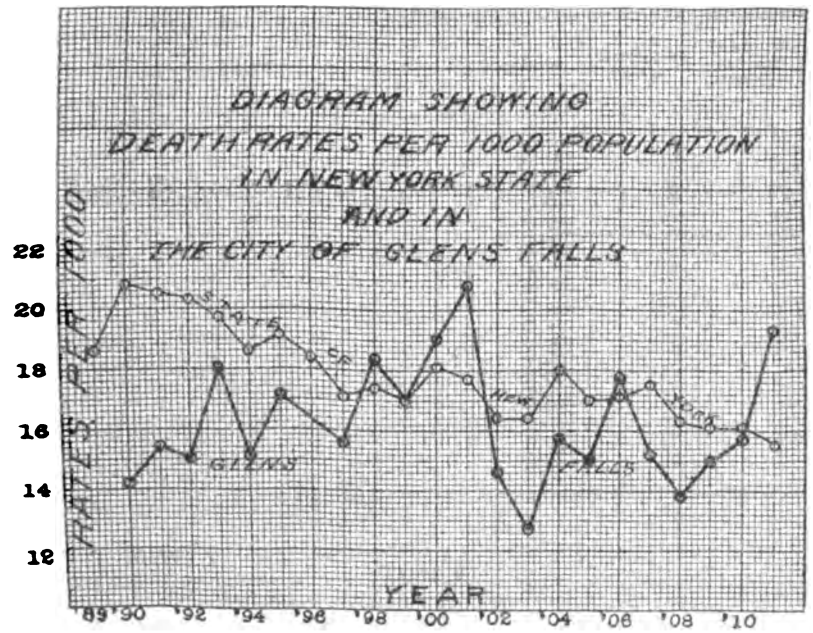
DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF GLENS FALLS
RATES PER 1000
22
20
18
16
14
12
YEAR
'89 '90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10
STATE OF NEW YORK
GLENS
FALLS

epidemic diseases which should be controlled by the local health authorities and which show plainly insanitary conditions not wholly under control. Again, although the Glens Falls average rate, 16.2, is lower than the average of the urban rates for the 10 years past, the high values of those rates were in the early part of the period and since 1908 the rate of the cities of the State has been 16.2 or below. Thus, in 1908, for all the cities of the State, the death rate was 16.2; in 1909, 15.9; in 1910, 16.2, and in 1911, 15.4, indicating that Glens Falls is barely on a par with the average of other cities during the past four years. Again, except for 1904, the city rate of the State shows a continuous downward tendency, as shown in Table 2:

TABLE 1

Showing the Population, the Number of Deaths and the Death Rate per 1,000 Population in Glens Falls for the Years 1890 *to* 1911 *Inclusive*

YEAR	Population	Number of deaths	Death rate per 1,000 population
1890	10,000	142	14.2
1891	10,261	168	15.4
1892	10,522	168	15.0
1893	10,783	194	18.0
1894	11,044	167	15.1
1895	11,305	193	17.1
1896	11,566	199	16.3
1897	11,827	185	15.6
1898	12,089	222	18.3
1899	12,351	211	17.1
1900	12,613	240	19.0
1901	13,020	271	20.8
1902	13,427	196	14.6
1903	13,834	175	12.7
1904	14,242	223	15.7
1905	14,650	220	15.0
1906	14,768	262	17.7
1907	14,886	229	15.2
1908	15,005	207	13.8
1909	15,124	226	14.9
1910	15,243	241	15.7
1911	15,389	296	19.3

TABLE 2

Showing the Average Death Rates for All the Cities of the State for Years 1900 *to* 1911 *Inclusive*

YEAR	Death rate	YEAR	Death rate
1900	19.5	1906	17.8
1901	18.8	1907	17.9
1902	17.6	1908	16.2
1903	17.4	1909	15.9
1904	19.1	1910	16.2
1905	17.7	1911	15.4

Glens Falls, however, shows no such tendency, but rather shows a marked increase in death rates since 1903. Similarly, the curve shown on Figure 1, showing the death rates for the State, has an unmistakable downward direction. The curve for Glens Falls, on the other hand, goes in an upward direc-

tion from 1889 to 1901 and then drops so that, in 1903 mum position. Since 1903, it has again been going up, 1907 and 1908, and this last year, 1911, the rate has bee year of the period except 1901. It must be agreed, ther average death rate for a twenty-year period compares fa time average, either for the State or for the cities of th in comparison with either, the rate of Glens Falls is hig commentary on the sanitary enlightenment of Glens Falls the State as a whole and in the cities of the State, the ing, due undoubtedly to a better knowledge of sanitation a appreciation of that knowledge, the local death rate is inc year the highest, with one exception, of any year in the were, indeed, in 1911, but nine cities of the State out of f higher death rates, a comparison which cannot but be un of Glens Falls.

In order to ascertain, if possible, the reason for the large in 1911 and 1903, Table 3 has been prepared showing the defined by the reports of the State Department of Health. that while there are 121 more deaths in this last year tha or 69 per cent., the population has increased 11 per cent., s in population cannot in any way account for the much g ately, number of deaths. By studying this table, it will is no one disease or cause of deaths to which the large tot ascribed. The largest increase is for pneumonia, 20, and t nervous diseases, 19, this group including apoplexy, paral convulsions. Tuberculosis of all kinds has increased by 11 Diarrhea of children has increased by 5 and other digesti caused 11 more deaths in the more recent years. Bright's di 12 more and measles 5.

TABLE 3

Showing Deaths from Specific Diseases in Glens Falls for and 1911, with Increase or Decrease

	Total	Typhoid fever	Malaria	Small pox	Measles	Scarlet fever
1903	175	4	1	......	......	......
1911	296	1	......	......	5	1
Decrease	......	3	1	......	......	......
Increase	121	......	......	......	5	1

	Influenza	Other epidemic diseases	Tuberculosis lungs	Other tuberculosis	Cancer	Diabetes
1903	......	......	13	3	10	4
1911	4	......	21	6	25	6
Decrease	......	......	......	......	......	......
Increase	4	......	8	3	15	2

TABLE 3 — *Continued*

Showing Deaths from Specific Diseases in Glens Falls for the Years 1903 *and* 1911, *with Increase or Decrease*

	Circulatory diseases	Pneumonia	Other respiratory diseases	Diarrhea under 2 years	Diarrhea over 2 years	Other digestive diseases	Bright's disease
1903	21	8	6	8	4	13	7
1911	23	28	10	14	3	24	19
Decrease	......	......	......	......	1	......	......
Increase	2	20	4	6	....	11	12

	Child birth	Early infancy	Suicide	Violence	Ill defined	All other diseases
1903	3	6	......	8	5	26
1911	5	2	5	11	3	19
Decrease	......	4	......	......	2	7
Increase	2	......	5	3	......	....

As a summary, it may be roughly said that the constitutional diseases, due to the wearing out of the body, to old age or to physical excesses of various sorts, have caused an increase of 70, a little more than one-half, and that these diseases are the result of the wearing out of the body, of neglect of the practice of personal hygiene or of accident and that the deaths are outside of the domain of public sanitation. Further, that there was an increase of 66 deaths, nearly one-half, in contagious or bacterial diseases, which may properly be held in check by adequate sanitary authority. (There was a reduction in the number of deaths under a few headings, enough to make the total number 121, as shown in the table.)

It would seem that the number of deaths of children should be prevented from increasing, that the number of deaths from tuberculosis suggests the need of active anti-tuberculosis measures and that the increase of deaths from general digestive disturbances invites attention to the quality of food and of the milk and water supplied the city. In order to have had the rate in Glens Falls, in 1911, no larger than that for the State, 15.5, it would have been necessary to prevent 58 of the 286 deaths. This could have been done if measles had not spread, and one death only had occurred, if anti-toxin had prevented three of the four diphtheria deaths, if the number of deaths from tuberculosis had been held to the number in 1903, if the number of deaths of children, due to convulsions, had been reduced, so that five of the deaths from nervous diseases would have been saved, if the deaths of infants from diarrhea had been reduced to seven instead of fourteen and from other digestive disturbances to twelve instead of twenty-four, and if pneumonia had been checked in time to prevent more than sixteen deaths.

Nor is the rate of 15.5 abnormally low, even if it is the lowest that New York State has ever had. In Michigan, for the past ten years, the rate has been continually below 14, and in Indiana, it has been between 12 and 13. The following table (Table 4) shows the death rates in several States for the four-year period 1901–1905 and by years from 1904 to 1909.

TABLE 4

Showing the Number of Deaths per 1,000 Population in Registration Area

STATE	Annual average 1901 to 1905	DEATHS PER 1,0		
		1904	1905	1906
New York	17.1	18.0	17.0	17.1
Maryland	......	......	......	15.7
Connecticut	16.0	15.9	16.5	16.7
Michigan	13.3	13.6	13.5	14.3
Indiana	13.0	13.5	12.8	12.5

Other countries, too, have rates compared with which ev of the State as a whole are high. Thus in Table 5 it ma Scandinavian countries have rates lower than New York ɛ to hold those rates for a period of years. England has ra of its large cities and general density of population, are l with which the 1911 rate in Glens Falls, 19.3, looks very hi

With respect to typhoid fever, Glens Falls does not comp the rest of the State. Table 6 shows the population of th from typhoid fever and the death rates per 100,000 popula twenty-two years and Figure 2 shows those rates plotted to lar rates for New York State. It will be noted that the rat very irregular, alternately high and low, and that the avera than that of the State. In nine years out of twenty-two, th over, and in ten years the rate was below 25. It has been ence and statistics that it is quite possible in cities where pı is exercised over the quality of the water and milk supplies parts of the United States, to maintain a typhoid fever deat and it is not unreasonable to expect that rate to be reduced tary progress gains further headway.

TABLE 5

Showing General Death Rates per 1,000 Population of For

COUNTRY	Annual average 1901 to 1905	1904	*1905*
Australian commonwealth	11.7	11.0	10.8
Austria	24.2	23.7	25.0
Belgium	17.0	16.9	16.5
Denmark	14.8	14.1	15.0
France	19.6	19.4	19.6
German Empire	19.9	19.6	19.8
Italy	21.9	21.1	21.9
Norway	14.5	14.3	14.8
Spain	25.8	25.4	25.4
Sweden	15.5	15.3	15.6
Switzerland	17.7	17.8	17.9
England and Wales	16.0	16.2	15.2

Figure No. 2

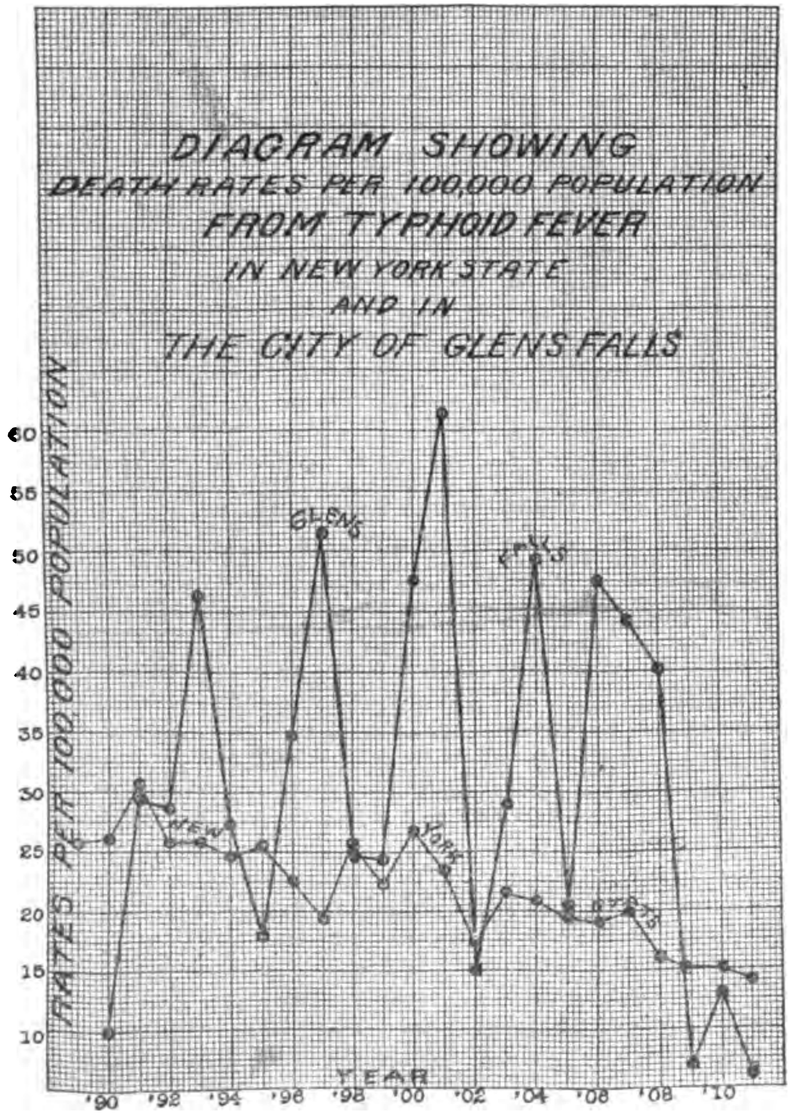

DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF GLENS FALLS
RATES PER 100,000 POPULATION
60
55
50
45
40
35
30
25
20
15
10
GLENS
FALLS
NEW
YORK
STATE
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

TABLE 6

Showing the Population, the Number of Deaths from Typhoid Fever and the Death Rate per 100,000 *Population in the City of Glens Falls for the Years* 1890 *to* 1911 *Inclusive*

YEAR	Population	Number of deaths from typhoid fever	Death rate per 100,000 population
1890	10,000	1	10.0
1891	10,261	3	29.2
1892	10,522	3	28.5
1893	10,783	5	46.4
1894	11,044	3	27.2
1895	11,305	2	17.7
1896	11,566	4	34.6
1897	11,827	6	50.7
1898	12,089	3	24.5
1899	12,351	3	24.3
1900	12,613	6	47.5
1901	13,020	8	61.4
1902	13,427	2	14.9
1903	13,834	4	28.9
1904	14,242	7	49.2
1905	14,650	3	20.4
1906	14,768	7	47.4
1907	14,886	7	47.0
1908	15,005	6	40.0
1909	15,124	1	6.6
1910	15,243	2	13.1
1911	15,389	1	6.0

The average rate for Glens Falls for the past 22 years is 30.7, at least 10 per 100,000 more than the maximum permitted under good sanitary control. Or, considering only the number of deaths and the size of the city, two deaths from typhoid fever in Glens Falls should be considered a maximum number and a number greater than this is a cause for alarm and greater activity on the part of the local board of health. In 1901 there were 8 deaths; in 1904, 1906 and 1907, 7 deaths each, and in 3 other years 6, as shown in the table. Since each death usually is accompanied by about 10 cases of illness not fatal it is readily seen that proper and successful effort to reduce the amount of this disease will materially aid the efficiency of the city's population and lower both the amount of suffering and unnecessary expense attendant on the present high rates. In order to demonstrate the possibility of lower rates from this disease Table 7 has been prepared showing death rates in other cities of New York State.

TABLE 7

Showing Death Rates from Typhoid Fever per 100,000 *Population in Certain Cities of New York State for the Years* 1904 *and* 1910

CITY	1904	1905	1906	1907	1908	1909	1910
New York	16.9	15.8	15.5	17.4	12.8	12.7	11.6
Rochester	15.2	10.5	16.2	14.3	11.6	6.6	13.7
Syracuse	14.7	14.5	9.2	11.6	15.2	11.1	27.5
Binghamton	9.6	12.0	9.1	13.2	15.2	13.1	12.4

For the past three years Glens Falls has had low rates, with one or two deaths only. But in 1908 there were six deaths, three times the permissible number. In a small city the tabulation of statistics and the inferences to

be drawn therefrom are not as conclusive as in larger cities since the addition or subtraction of a single death may change materially the conclusions which may be drawn from the statistics. But in the case of Glens Falls the excess of the number of deaths is so persistent and occurs in so many years that it leaves no doubt of the meaning of the statistics.

Again, in the State as a whole the efforts of the sanitary authorities and the greater appreciation of sanitary truths throughout the State is shown by the gradual reduction in the typhoid fever death rate. In 1891 this rate was 30.3, and in 1911 it was 14.7, a reduction of one-half, which had been almost steadily taking place. The curve, Fig. 2, shows the marked downward tendency.

The cause of typhoid fever has generally been found to be either polluted water or infected milk, the latter causing in general about 5 per cent. of the total number of deaths. Recently, also, such stress has been laid on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible without further investigation to say to which of these causes the occasional large number of deaths and the many accompanying cases of typhoid fever in Glens Falls have been due, and it must be left to the local health authorities to so examine the local conditions, the sanitary surroundings of the residences, the character of the milk distributed and the quality of the water supply as to be sure that they have taken every precaution to prevent a further recurrence of an excessive amount of this disease. The only two deaths occurred in 1910 and one each in 1909 and 1911 is a matter for congratulation and it is to be hoped that never again will Glens Falls be obliged to report a large number in one year.

Turning to the deaths of children under 5, it may be seen that while the average death rate at that age per 10,000 population is 34.8, there is a wide variation from that average in the several years. Thus, in 7 years the rate was more than 40 and in 8 years less than 30. It is not considered that this rate is particularly high unless it exceeds 50, provided all other conditions are normal. Glens Falls, however, has a low birth rate, 10 per 1,000 less than the average State for the past 5 years, so that the proportion of young children, that is, the relative number whose deaths are now being considered, is low. There can manifestly not be so many deaths under 5 if there are fewer children to die at that age. Thus, in Austria, where the birth rate is 35, the deaths of children under 5 years were 46 per cent. of all the deaths, while in France, where the birth rate is 21, the deaths of children were only 23 per cent. The Glens Falls birth rate has been 15.7 for the past 5 years and a correction for the low birth rate and the consequent small number of children would undoubtedly bring the death rate above 60, an excessive rate, indicating the prevalence of insanitary conditions among the very young. It is a hopeful sign, however, that the rate is growing less and that, except in 1906, the uncorrected rate has been below 30. It is always significant to find a high death rate among children, since they are particularly susceptible to organic impurities in water and milk, to impure or tainted food and to crowding together in unventilated rooms. A more comprehensive study of the Glens Falls conditions cannot be made here and unfortunately the exact figures of the population under five with which to compare the deaths under five is not furnished by the census bureau. But enough has been said to show that there is reason to believe that the corrected rate is high and that active efforts on the part of the local board of health are called for in order to remove the existing causes and to prevent unnecessary deaths among children.

The inference to be drawn then from these statistical studies is that the tendency shown by the general death rate in late years is upward rather than downward as with the State as a whole; that the average death rate is higher than it should be; that the typhoid fever rate is very irregular and generally higher than the normal for the State as well as higher than a reasonably ideal rate; that the deaths of children under five, while apparently few, are not so in reality, the error being brought about by a small

number of children; and that to remove these unfortunate conditions and to prevent the deaths due to local conditions which may be remedied active steps should at once be taken by the local health board. So far as could be learned the city has no conditions of drainage or of living which would account either for the high rate itself or for the tendency to increase which has been noted as characteristic in the past few years. The typhoid fever rate has not been so excessive as to suggest that the excess rate from general diseases has been caused by water supply since a polluted water is generally shown by the typhoid fever rate rather than by the general death rate. It would seem, however, that there must be present in Glens Falls conditions which have interfered with and are still interfering with the downward tendency of mortality rates exhibited through the State as a whole and that there are present also in the city conditions which cause unaccountable and sporadic variations in all of these rates. It is manifestly the duty of the health authorities to determine the cause of these variations and to take such steps as shall bring them under control.

Water Supply

The water supply of Glens Falls is a surface water coming from small streams on the eastern slope of Luzerne mountain, the latter rising abruptly from the plain four miles west of the city. The crest of the mountain is about 1,000 feet above the plain, but the reservoirs are only from 600 to 800 feet up. The watersheds are thus in the upper edge of ridges and in a region of country entirely uninhabited. There are three storage reservoirs and three small intakes or distributing reservoirs, the latter being only 200 feet above the city. From the storage reservoirs the water is let down in the open channels of the streams so that the water is well oxygenated in its flow over the rocks of the steep waterways, which are typical mountain brooks full of cascades and rapids, the beds broken by boulders and the water torn into foam at frequent intervals. The three reservoirs, already referred to, are named in their order from north to south, the Butler reservoir, the Wilkie reservoir and the Keenan reservoir. Fig. 3 is a part of a topographical sheet of the United States Geological Survey and shows the three reservoirs named with the contributing watershed. These areas are for the most part wooded, although there are some open fields formerly cultivated by farmers who have now moved away. Fig. 4 shows a view of the hillsides near the site of the Butler dam and indicates sufficiently the character of the watersheds. The following from the 1910 report of the Department traces the development of the watersheds from 1873 when the first main was laid.

"The first waterworks were built in 1872 and consisted of a small reservoir and intake formed by a dam built across the junction of two streams. This is known as the Wilkie intake, and the area flooded is about 9/10 of an acre. This supplied the needs of the village for a few years, the water being delivered to the city by gravity through a 12-inch cement-lined pipe.

"In 1875 a new intake and masonry intake basin was built in a watershed to the south of the Wilkie works. This intake, known as the Keenan, was connected by a 24-inch cast-iron pipe with the original system at a point now called the "upper junction."

"In 1878 a storage reservoir was built on the Wilkie watershed and near the headwaters of one branch of the stream some two miles above the intake. This reservoir, known as the Wilkie storage reservoir, has an area of about 18 acres, a capacity of 55,000 gallons and an average depth of 10 feet.

"In 1892 the Keenan storage reservoir was constructed by damming and flooding about sixty acres near the headwaters of the stream. This has a capacity estimated from 200,000,000 to 225,000,000 gallons. Its average depth is about twelve feet.

"In 1905 the city sought an additional supply and built the Butler intake on a stream from Butler pond. This is a small basin of masonry about 0.16 of an acre in area. The Butler storage reservoir was constructed in 1909 by Mr. H. M. West. It is located several hundred feet above the Butler intake and was formed by building an earthen dam with concrete corewall some sixty

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Again, in the State as a whole the efforts of the sa the greater appreciation of sanitary truths throughou by the gradual reduction in the typhoid fever death ra was 30.3, and in 1911 it was 14.7, a reduction of one- almost steadily taking place. The curve, Fig. 2, shows t tendency.

The cause of typhoid fever has generally been found water or infected milk, the latter causing in general a the total number of deaths. Recently, also, such stre the possible transmission of the disease by flies from drains or privies or polluted streams. It is not possi investigation to say to which of these causes the occas of deaths and the many accompanying cases of typhoid f have been due, and it must be left to the local healt examine the local conditions, the sanitary surroundings the character of the milk distributed and the quality o as to be sure that they have taken every precaution to recurrence of an excessive amount of this disease. Th occurred in 1910 and one each in 1909 and 1911 is a mat tion and it is to be hoped that never again will Glens l report a large number in one year.

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feet high. Near the center of the dam is a concrete spillway about twenty feet wide and adjoining a concrete valve chamber. Water can be drawn at four different levels, and discharges into the stream under the dam. This reservoir has a natural contour, but was stripped and cleaned before filling. The capacity is 130,000,000 gallons, area of water surface approximately fourteen acres and the depth averages about thirty-three feet.

"The pipes from all three intakes are converged and connected at the upper junction. From the upper junction a 12-inch cement-lined main and a 20-inch cast-iron main run to the 'lower junction.' From this point 16-inch and 12-inch cast-iron pipes deliver the water to the city distributing system at two points.

"The distributing system comprises about thirty-five miles of mains from 4 inches to 10 inches in diameter. The average pressure is about 85 pounds per square inch. The system is a gravity one throughout and only in case of emergency would temporary pumping be resorted to."

A thorough inspection of the watershed was made on May 13 and 14, 1910, by Mr. A. O. True, Assistant Engineer of the Department of Health. At that time, he reported the presence of but four houses, containing twelve people, on all the watersheds (3,373 acres) and possible pollution from only two of these. Since then, this possibility has been removed, so that any contamination of the water from human sources can be only by the accidental presence of some hunter or traveler over the watershed areas. It is said that there is some fishing in the reservoirs which would seem to be most undesirable. The water commission has steadily followed the policy since its formation, of acquiring as rapidly as possible the ownership of the various watersheds and on March 1, 1911, the amount of land owned on the three watersheds was 779 acres or 23 per cent. of the total. This is a most commendable showing and when taken in connection with the uninhabited character of the areas, should guarantee to Glens Falls a most excellent water. The commission has also taken steps to reforest some of the abandoned farms acquired by them. Some 150 young pines and spruce have already been set out.

The chief source of impurities in the water, as indicated by a sanitary analysis, is due to the presence of decaying organic matter, chiefly stumps and roots in the bottoms of the reservoirs. Figure 5 shows the appearance of these stumps in the Keenan reservoir at a time when the water was drawn off, and there can be no question of the bad effect of this decaying vegetation on the quality of the water. The commission, however, is impressed with the desirability of removing these stumps and cleaning up the reservoir bottoms and undoubtedly will proceed with this work, already started, as rapidly as possible.

Analyses of the water at the several intakes were made on samples collected by Mr. True in 1911 and the results gave the following indications:

"Though the results of the bacteriological analysis of the sample from the Wilkie intake show a total bacterial content, according to standard methods of 170 per c. c., they are consistent with what would be expected in a water of this type. Positive results for B. coli were obtained in two out of three of the 10 c. c. samples, and negative results in all of the 1 c. c. and 1/10 c. c. samples. These results are consistent with the conditions found in the sanitary inspection of the watershed. The occurrence of occasional positive results for B. coli in large samples of water from a watershed known to be in good sanitary condition, cannot be taken as evidence of the unsatisfactory sanitary quality of the supply.

"The chemical analyses of samples from the Keenan intake are characteristic of a normal surface water of this locality. The bacterial content is not abnormal and the absence of positive tests for B. coli is consistent with conditions existing on the watershed.

"The chemical analyses of the samples collected from the Butler intake show a greater organic content than the other sources. This is indicated in the higher color, albuminoid ammonia and oxygen consumed. The bacteriological results, however, are satisfactory, and an inspection of these analyses, together with a knowledge of physical conditions on the watershed, indicate that the water from the Butler reservoir is of good sanitary quality. The

high organic content is undoubtedly due to the coloring extracted from natural organic substances on the watershed, and is not, at least to any appreciable extent, traceable to pollution from dwellings."

Table 8 gives the results of all the analyses made of the mixed waters delivered to the city from December, 1910, to January, 1912. These analyses show a water somewhat heavily charged with undecomposed organic matter, soft and clear, but occasionally highly colored and with a faint vegetable odor. The number of bacteria is sometimes high (as on December 14, 1911), but is generally low, in view of the surface water supplied. B. coli was found in all of the 10 c. c. samples, but in view of the character of the watershed, this has no sanitary significance. The results, then, of the examination of the watershed and of a study of the analyses of the water fail to show any indications of the presence of an excess of animal organic matter in the water or any evidence that the variable and high death rates can be attributed to the water. It would, however, be desirable to continue the practice of regular sanitary inspection of the watershed and particularly of those parts of the watersheds used for pasture land, in order that accumulations of manure may not occur in the immediate vicinity of the brooks.

TABLE 8

Report of Water Analyses for the City of Glens Falls

Date collected	12/27/10	2/6/11	4/26/11	7/5/11	7/5/11
Color	20	40	5	10	45
Turbidity	5	5	Clear	....	....
Odor, cold	1 veg.	1 veg.	1 veg.	1 veg.	1 veg.
Odor, hot	2 veg.	2 veg.	1 veg.	1 veg.	2 veg.
Solids:					
Total	53.	42.	30.	69.	60.
Loss on ignition	26.	21.	17.	13.	24.
Mineral residue	17.	21.	13.	56.	36.
Nitrogen as					
Free ammonia	.032	.070	.004	.024	.010
Albuminoid ammonia	.090	.080	.028	.030	.086
Nitrites	.001	.001	.002	.001	Trace
Nitrates	0.20	0.10	.06	0.80	0.10
Oxygen consumed	4.80	5.10	2.50	1.50	4.30
Chlorine	0.25	1.25	0.25	0.75	0.75
Hardness:					
Total	15.6	16.9	12.7	47.1	18.2
Alkalinity	11.	15.	7.	22.	13.50
Bacteria per c.c.	1,700.'	150.	250.	....	300.
B. coli type:					
10 c.c.	Present	Present	Present	Absent	Present
1 c.c.	Absent	Absent	Absent	Absent	Absent
1/10 c.c.	Absent	Absent	Absent	Absent	Absent

Date collected	8/30/11	8/30/11	12/14/11	1/30/12
Color	35	....	15	25
Turbidity	15	....	Trace	Clear
Odor, cold	1 veg.	....	1 veg.	1 veg.
Odor, hot	2 veg.	....	1 veg.	2 veg.
Solids:				
Total	52.	....	48.	42.
Loss on ignition	21.	....	14.	16.
Mineral residue	31.	....	34.	26.
Nitrogen as				
Free ammonia	.010	....	.002	.050
Albuminoid ammonia	.030	....	.078	.044
Nitrites	.002	....	Trace	Trace
Nitrates	.10	....	0.08	0.16
Oxygen consumed	7.20	....	4.10	3.40
Chlorine	1.25	....	1.25	0.25
Hardness:				
Total	18.20	....	16.9	15.6
Alkalinity	12.00	....	11.	13.
Bacteria per c.c.	1,050.	300.	4,600.	190.
B. coli type:				
10 c.c.	Present	Absent	Absent	Present
1 c.c.	Absent	Present	Absent	Absent
1/10 c.c.	Absent	Absent	Absent	Absent

Conclusions

1. Glens Falls is a well-located manufacturin; with every natural sanitary advantage accruing and environment. The distribution systems for t practically the whole city and there are appare conditions of housing or of labor.

2. The general death rate, although its avera; that of the State for a long period of years, yet in any one of several tests. The rate for Glens Fall for the State as a whole and higher than the ci average rate, even for long periods, is greater tha

3. The excess of deaths is partly due to constitu to preventable infectious diseases, but a reduction to bring down the general death rate to a normal

4. The death rate from typhoid fever is generally although for the past three years it has been unifo.

5. The death rate among young children is appar birth rate in Glens Falls indicates that the number normal and therefore that the ratio of the deaths of tion is unnaturally low, the small number of childre tual figures are not available but it would appear rate of children is high, an indication of a prevale drink.

6. The water supply is a surface one from an un top of Luzerne mountain. Although the analyses made presence of organic matter, although the bacterial cou and although bacteria of the B. coli type are freque samples, it is believed that the water contains foreign origin only and not essentially of a disease-producing

Recommendations

1. It is recommended that the water board persever acquiring property on the watershed and of reforesting tunity offers.

2. It is also recommended that the water board make inspections of the watershed and particularly of those a streams between the storage reservoir and the intakes; fishing from the reservoirs; and that they require thos the brooks to be kept free from manure and the broo cattle.

3. It is recommended that the local board of health ta tion the increasing death rates in the city, the irregula fever death rates, and the number of deaths of children, w tuting such reforms in the quality of foods supplied by de liness of the market milk, in the oversight of infectious di in the schools, and generally in the conditions of living t in order that the death rates may be decreased and the correspondingly increased.

Respectfully submitted,
HENRY N
Special Ass

Copies of this report were inclosed in letters addressed water commissioners and to the other city authorities, urgi taken to carry out the recommendations contained in the re

GLOVERSVILLE

ALBANY, N. Y., *March* 30, 1912.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on the sanitary condition of the city of Gloversville, particularly as affected by the quality of its water supply. The visit to Gloversville on which this report is based was made in July, 1911, and the studies of statistics have been made during the month of February, 1912.

The city of Gloversville lies on a small creek flowing from the north into the Mohawk river and is about nine miles north of the village of Fonda on that river. The small creek on which the city is located is known as Cayadutta creek and, particularly in the summer time, it has very little flow, the measured volumes in July and August being not more than six cubic feet per second. The site of the city is on the southern edge of the Adirondack region, and, while the city itself is 500 feet above the Mohawk river at Fonda, the country to the north within a distance of four miles rises 1,000 feet higher still. About two miles north of the city a rocky and steep hillside is found leading up to a plateau of an elevation of about 1,600 feet and it is from this side hill slope that the water supply of the city is obtained.

A steam railroad known as the Fonda, Johnstown and Gloversville railroad connects the city with Fonda, where connections are made with the New York Central railroad east and west. This road continues to the north, reaching the village of Northville. Of late a more convenient method of communication has been found in the electric railroad which runs from Fonda to Gloversville and also from Gloversville to Amsterdam, Schenectady and Albany.

Gloversville is the seat of the glove manufacturing industry in the United States, and by the census report of 1910 had a population of 20,842. Because of the glove industry there are twenty-six tanneries within the city limits which dress glove leather and the finer qualities of shoe leather. There is also one hair mill, knitting mill, two silk mills and a brewery.

All of the domestic sewage, tannery refuse and mill wastes have up to the present been emptied into the waters of Cayadutta creek during its progress through the city. The creek is a small one, as has already been pointed out, and the amount of sewage dilution varies from three to ten times. The convenience of the citizens has been well taken care of by a complete system of sewers and pressure of threatened litigation has, since 1907, compelled the city to take steps to relieve the stream of the pollution, which had become a veritable nuisance. At the time of the inspection (July, 1911) disposal works were under active process of construction and it was hoped that the wastes from the houses together with the mill wastes, from which the solids had been partially removed by sedimentation, would soon be purified by these works before discharge into the stream.

Vital Statistics

The average general death rate per 1,000 in Gloversville is apparently much lower than that for the State as a whole. Table 1 shows the population, the number of deaths annually in the city and the death rate per 1,000 for the 21 years, 1890 to 1910 inclusive. It will be noted that the minimum death rate, 12.1, occurred in 1900, and that in 1894, 1897 and 1903 the death rates were in each case below 13. The average for the 21-year period is 14.4. The highest rate was in 1908 when it reached the figure of 17.2. In order to show the meaning of these rates when compared with other cities and countries the following comparisons may be made:

TABLE 1

Showing the Population, the Number of Deat per 1,000 in the City of Gloversville for th

YEAR	P
1890	
1891	
1892	
1893	
1894	
1895	
1896	
1897	
1898	
1899	
1900	1
1901	1
1902	1
1903	1
1904	1
1905	18
1906	19
1907	19
1908	19,
1909	20,
1910	20,

Fig. 1 shows both the general death rate of New twenty-one years and the death rate of Gloversvi the difference between the two curves and the marked ville being plainly indicated. The dotted line on tl rected death rate for Gloversville, taking into account present out of the total population. In the diagram there is a marked tendency in the curve for the State larly from 1890 to 1910. This tendency is not shown ville since from 1890 to 1906 the curve, although subje is almost always in the vicinity of the 14 rate line, one side or the other with about equal frequency. I the rate has been noticeably higher, the average for t 1.5 higher than the average for the 21-year period.

In comparison with other cities of the State Glove a low death rate. In 1900, out of 49 cities of the Stat higher than Gloversville's average, 14.4. The average State in that year was 16.1, the unusually high rate for year being still lower than the average for the cities of the rate in Gloversville, 17.2, was unusually high, and nine cities of the State had a higher rate. It is this var seems to be local in character and independent of any that awakens concern for the sanitary condition of the cit

Since the number of deaths in a community depend larg ber of children in that community it is of interest to n rate in Gloversville is unusually low. In 1910 the birth 1,000 population, whereas the average urban rate of the S more than that in Gloversville. Thirty-five of the cities higher birth rates than Gloversville and it is a reasonable d number of children in Gloversville is therefore below the State. With a birth rate 7.5 lower than normal and with 20,730 it would appear that the number of births in Glove is 150 less than is reasonable and normal, and since about the deaths are of children under one year, there are, merel

Figure No. 1

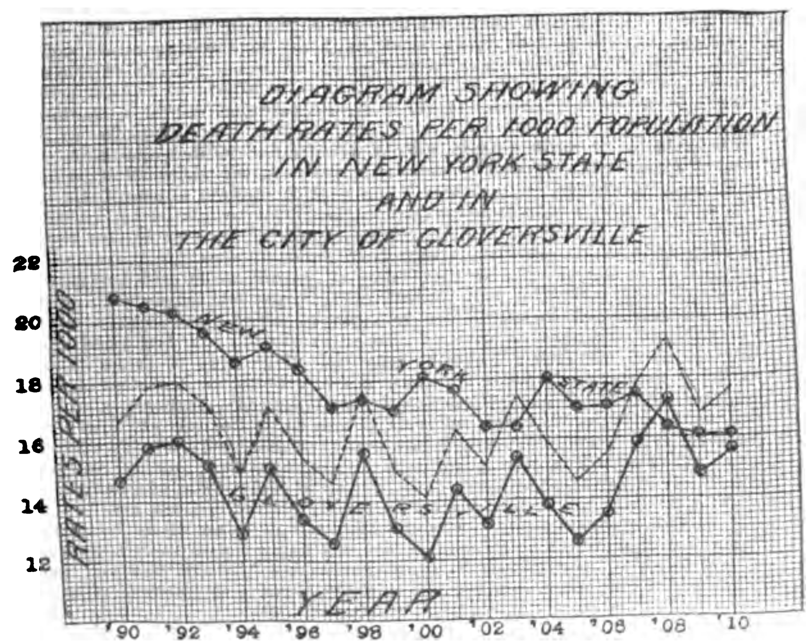

DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF GLOVERSVILLE
RATES PER 1000
NEW
YORK
STATE
GLOVERSVILLE
YEAR
22
20
18
16
14
12
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

of the fewer number of children, fifty fewer deaths in Gloversville on this account alone. If the death rate in Gloversville be increased by the ratio of 50 deaths to the population, the rate is increased 2½ per 1,000. The dotted line in Fig. 1 shows this increased death rate, the result of such a computation being to increase the rate to such an extent that in the last four years it is plainly higher than the death rate of the State. The inference to be drawn is that, while apparently the death rate in Gloversville is low, really it is only apparently low and is the result of the small number of children in the city and that by correcting the death rate for the ages of the population the death rate becomes greater of late years than that of the State as a whole.

Why the birth rate is low is, perhaps, not a question to be discussed here, although it may be pointed out that it has been plainly shown by studies made, particularly in England and Germany, that a community in which a large number of the female population are employed in factory or other hand work, the birth rate of children is low and the death rate is high. Various causes have been pointed out for these facts which may indeed be disputed by reference to the individual cities, particularly as to the birth rate. The death rate though is almost always high, due generally to the demands of labor and often to the voluntary neglect of the ordinary rules of personal hygiene as affecting both mother and child. Artificial feeding of infants, in order that the mother may more readily comply with the demands of factory life, is probably the greatest single cause of high infant death rates. The low birth rate is perhaps not so much a matter of hygiene as a matter of statistical inaccuracy or interpretation on account of the large number of unmarried women at work in the factories.

The general death rate in New York State, however, is relatively high when compared with other States, its rate being as high as second and never lower than fifth among the registration States. The following table, Table 2, shows the annual death rates of some of the States of the Union for the past nine years and it is plainly to be seen that the average rate for Gloversville, 14.4, which is apparently low when compared with the rate for the State as a standard, is not low when compared with the average of other States for a standard. In Michigan, for example, the death rate for the past 10 years has been below 13 and is therefore lower .9 per 1,000 than the Gloversville rate for the past 21 years and 2 per 1,000 lower than that of Gloversville for the past four years. The death rate in Indiana has been between 12 and 13, and, while it may be that some inaccuracies in the death rate of Indiana are due to imperfect registration and to the relatively large proportion of adult males in the population, yet the advantage due to the sanitary conditions under which the sparse population throughout the rural districts live and the hygienic surroundings of the citizens in small towns undoubtedly is shown to a large extent in this reduced death rate.

TABLE 2

Showing Number of Deaths per 1,000 Population in Certain States of the Registration Area

STATE	Annual average 1901 to 1905	DEATHS PER 1,000 POPULATION					
		1904	1905	1906	1907	1908	1909
New York	17.1	18.0	17.0	17.1	17.5	16.3	......
Maryland	......	......	......	15.7	16.1	15.5	......
Connecticut	16.0	15.9	16.5	16.7	17.1	15.4	......
Michigan	13.3	13.6	13.5	14.3	13.9	13.8	13.1
Indiana	13.0	13.5	12.8	12.5	12.5	12.3	......

In respect to typhoid fever, statistics show t
ville are such as to produce wide variations in
ease. Table 3 shows the number of deaths fron
since 1890, together with the death rates per
shows these rates, together with the correspo
throughout the State for the same period. T
for the State is similar to that for the general
have a downward tendency, the rates in the las
edly less than in the period 1890–1895. The ra
30.5 and since that time the rate has steadily d
was 15.1, and in 1910, 15, the lowest value eve
rates in Gloversville vary from five to fifty, this e
acteristic of localities where sanitary condition
control. In the five years, 1890, 1895, 1900, 190
all high, though showing a downward tendency c
for the year 1908, the rates since 1902 have bee
would be expected in any urban community.

TABLE 3

Showing the Population, the Number of Deaths fr
Death Rate per 100,000 Population in the City of

YEAR	Populatio
1890	13,864
1891	14,279
1892	14,694
1893	15,150
1894	15,607
1895	16,064
1896	16,421
1897	17,978
1898	17,435
1899	17,892
1900	18,349
1901	18,413
1902	18,477
1903	18,542
1904	18,607
1905	18,672
1906	19,066
1907	19,460
1908	19,854
1909	20,248
1910	20,642

Basing a statement on experience in other countries, it i
to expect that where sanitary conditions are carefully o
rates from typhoid fever should not be more than 15 per 1
way and Sweden and in Denmark, the typhoid fever rates
10 per 100,000. In a few cities of the United States, where
is purified and its quality is above suspicion, where the m
spected regularly and its quality approved, the typhoid fe
tained at an equally low value. It will be noted that in the
ville, for the majority of the years shown in the diagram, t
than 15, a majority of the points being above the 15 line.

In a small city, the tabulation of statistics and the inferen
therefrom are not as conclusive as in the case of larger cities
tion or subtraction of a single death materially changes
which may be drawn from the statistics. But a proper typh

Figure No. 2

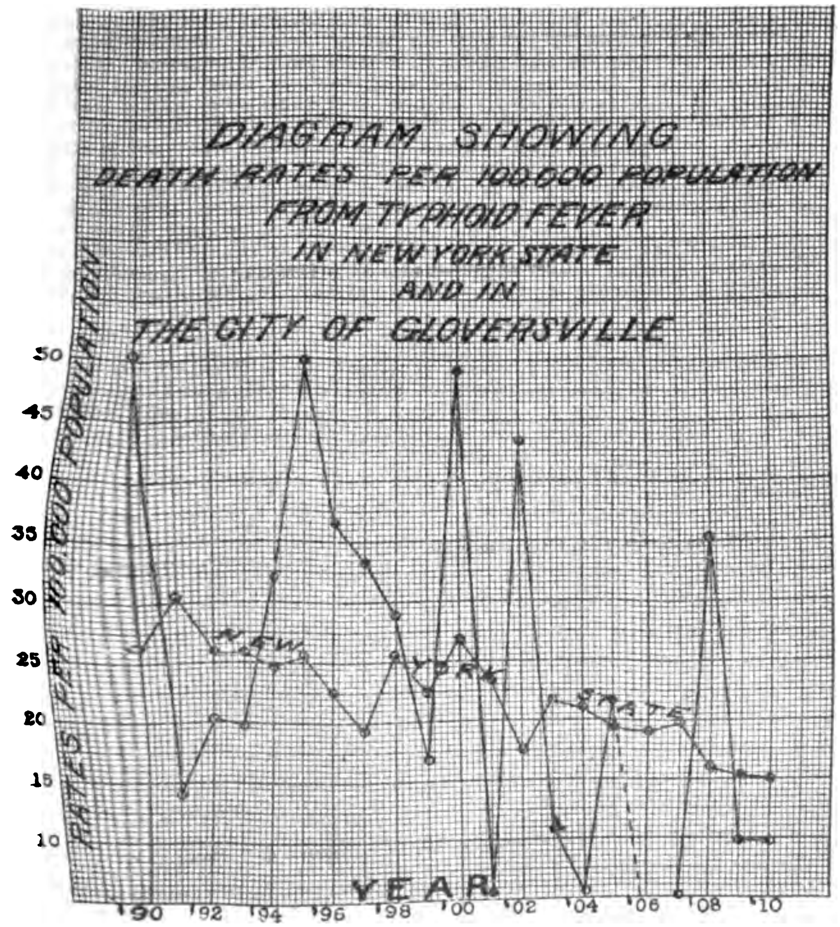

DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF GLOVERSVILLE
RATES PER 100,000 POPULATION
50
45
40
35
30
25
20
15
10
NEW YORK STATE
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

rate in Gloversville does not allow more than two deaths in the year, this number corresponding to a rate of 10 per 100,000. Manifestly, with the number of deaths increased to six or eight or even nine, as in 1900, the number of deaths has become excessive and calls for an investigation on the part of the health authorities and a strenuous effort on their part to prevent a recurrence of such an epidemic. That seven deaths should have occurred in 1908 indicates a laxness on the part of the sanitary authorities and a probable contamination of either the milk or water supply. The cause of typhoid fever has generally been found to be either polluted water or infected milk. Recently, also, much stress has been laid on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible, without further investigation, to say to which of these causes the occasional large number of deaths and the many accompanying cases of typhoid fever in Gloversville have been due, and it must be left to the local health authorities to so examine the local conditions, the sanitary surroundings of the residences, the character of the milk distributed and the quality of the water supply, as to be sure that they have taken every precaution to prevent a further recurrence of an excessive amount of this disease. That only two deaths occurred in 1909 and in 1910 is a matter for congratulation and it is to be hoped that never again will Gloversville be obliged to report a large number in any one year.

Turning to the number of deaths of children under five years, a more hopeful condition of things is found, apparently, to exist. Under normal conditions, the death rate of children under five years is about 50 per 10,000, as

TABLE 4

Showing the Population, the Number of Deaths of Children under Five Years and the Death Rate per 10,000 *Population in the City of Gloversville* 1890–1910

YEAR	Population	Number of deaths under 5 years	Death rate per 10,000 population
1890	13,864	59	42.6
1891	14,279	78	54.6
1892	14,694	58	39.5
1893	15,150	69	45.2
1894	15,607	56	35.9
1895	16,064	58	36.1
1896	16,421	34	20.7
1897	17,978	37	20.6
1898	17,435	72	41.2
1899	17,892	61	34.1
1900	18,349	49	26.7
1901	18,413	46	25.0
1902	18,477	41	20.6
1903	18,542	55	29.7
1904	18,607	43	23.1
1905	18,672	59	31.6
1906	19,066	43	22.6
1907	19,460	73	36.9
1908	19,854	60	30.2
1909	20,248	49	24.2
1910	20,642	74	35.8

determined by the rate for the United States as a whole and for the States of New York and Massachusetts. Since the number of children in Gloversville has been already shown to be somewhat below the normal, one would not expect that the death rate of children under five in Gloversville would reach the value of 50 but would be somewhat lower. As an example and proof of this, the death rates in France and Austria may be cited. The birth rate in Austria is 35 per 1,000, and in France, 21 per 1,000. In Austria 46 per cent. of all the deaths in a single year were of children under five years,

while in France, 23 per cent. of the deaths
It follows, therefore, that the normal numbe
ville, where the birth rate is lower than in N
of the State as a whole, and instead of findi
were of children, probably not more than 30
provided that the sanitary conditions in Glo
of the State as a whole.

The average rate for the twenty-one year
and in the earlier part of the period from 1
excess, reaching 54.6 in 1891. Since *1895, th*
in 1898, in 1907 and in 1910 *there* was a ma
are, that since children of tender age are *espe*
conditions and respond most *promptly to dig*
impure milk and polluted *water,* these occasi
children, together with the variable death *rat*
trol and of uniform conditions. *The actual* s
cannot be ascertained without definitely correct
children under five for the number of *children i*
and comparing these corrected rates *with* simil
whole. Unfortunately, the Census Bureau of th
port the number of the population by *various age*
25,000, therefore there is, *apparently,* no way of
tion. The variation of the rate, however, and *th*
in which this rate is high, even with *the uncorr*
proper care in the homes of the *children* and any
be brought about by more active work on the *part*

The inference to be drawn, then, from *the statisti*
made is that the tendency shown by the values of
tive years is alarming, since it fails to indicate *any*
ing efforts of the board of health and *seems to in*
ordinary precautions which are becoming so gener
the State as a whole. So far as could be *learned, th*
of drainage or of living which would *account* either
or for the tendency to increase, which has been noted
past few years. The typhoid fever rate has *not been*
gest that the excess rate from general *diseases* has bee
ply, since a polluted water is generally shown by the *ty*
than by the general death rate. It would *seem, howev*
present in Gloversville conditions which *have* interfere
fering with the downward tendency of mortality *rates*
State as a whole and that there are present *also in the*
cause unaccountable and sporadic *variations* in all the
festly the duty of the health authorities to determine *th*
ations and to take such steps as shall bring *them under*

Water Supply

The waterworks of Gloversville date from the year 187
construction commenced and when some $75,000 *was exp*
time and contemporaneously with the growth *of the city,* a
made, until now the entire cost of the system amounts to a
dollars.

The supply is a surface water collected *and stored* in a
reservoirs at the foot of the slope which rises abruptly abou
of the city. This row of reservoirs (see Figure 3), *all of t*
same level, extends a distance from east to *west of* about fiv
nection between them is maintained by pipes from which co
to the city through one or both of the main supply *lines. Th*
of these reservoirs is known as the Jackson *Summit* reservoir
that, while normally it receives only the water from a small
down the hillside, it may also receive the creek water *from J*
and above, the creek being known as the *Mayfield* creek and

ably the poorest of any of the supply. About a mile above this reservoir on the Mayfield creek is the little village of Jackson Summit, where are about a dozen houses, and above the mill dam is a shallow pond where the waters exposed to the sun during the summer become heated and where excessive vegetable growths are encouraged.

Next westerly from the Jackson Summit intake, for it is little more than this, is the Beech creek reservoir, containing 200,000 gallons. This small reservoir discharges into the main leading westerly from the Jackson Summit intake and reaches the Rice creek reservoir after a run of about three miles. The Rice creek reservoir contains 3,000,000 gallons and just above this is a purely artificial basin known as the Rice creek storage reservoir, which contains 130,000,000 gallons, and is of great importance in maintaining the supply through the dry season. This reservoir is 345 feet above the city and is being continually improved by excavation, smoothing the walls and improving the surroundings. About a mile further west, and at about the same elevation, is the Port creek intake, a small reservoir on Port creek from which waters are led into the Rice creek storage reservoir, although actually in another watershed. Below this chain of supply reservoirs are three small ponds which have been originally used as a direct source of supply to the city. On the map, Figure 3, one reservoir is the Kingsboro supply, owned by a private company and supplying a small portion of the city north of the railroad. A city reservoir, known as Potter pond, 177 feet above the city, contains 10,000,000 gallons but is not in constant use. The elevation is comparatively low. The water in summer is badly infected with algae and use is made of this water only when the other supplies become very low. Another reservoir, known as the Poorhouse supply, is a small pond used to supply the poorhouse, although originally it supplied the resident section of the city through a pipe line running down West street.

The quality of the water in the several reservoirs is generally good. The drainage areas are very sparsely populated and, except in the case of the Mayfield creek reservoir already referred to, there are no communities or hamlets on the area. It is generally wooded and the larger part of the area is a surface slope of at least 1 to 10.

The waterworks company have adopted the policy of securing possession of the areas immediately adjoining the several reservoirs and of extending their holdings to include, as far as possible, the entire watershed, so that in the course of time the drainage area will be owned by the city. In connection with this policy they have also adopted a tree planting policy by which, in due time, the entire area of the watershed will be covered with pines and other similar evergreen trees. In the year 1910, 60,000 trees were set out in the Port creek and Rice creek watersheds. The latter drains a portion of the area at the foot of the slope where farming operations have, in the past, been carried on and where most of the untimbered land is to be found. The plans of the Department include planting 10,000 trees in 1913 and 30,000 per year for the next four years. The effect of this should be two-fold, in that it will reclaim from farming operations the area in the vicinity of the intakes and in that it will tend to make more uniform the discharge of water from the watershed.

Some difficulty has been experienced in the past on account of the pollution entering the Rice creek storage reservoir from cottages on the slope and in the vicinity of the electric railroad running to Mountain lake. A number of these cottages have been built with little regard for disposal of wastes so that danger from pollution after a rain storm on account of the waters draining into the storage reservoir was very great. This danger has been eliminated, or is in process of elimination, by the purchase of the cottages and lands on which the cottages stand, so that, except for pedestrians, the drainage from the side hill will be without any possible contamination. There is a caretaker living in the vicinity of the Port creek intake. The superintendent of the waterworks occupied a tent in the vicinity of the Rice creek storage reservoir through the summer months, so that these two important sources of water were guarded and patrolled, at least to some extent, during the months when danger of pollution is most to be feared.

The character of the water can be observed from the an Department which are given in Table 5. These show tha

TABLE 5

Report of Water Analyses of the Kingsboro and Municip City of Gloversville

Collected on	12/28/10	4/5/11	5/31/11	7/6/11	8/31/
Collected from	Kingsboro supply	Kingsboro supply	Kingsboro supply	Kingsboro supply	Kingsb supply
Color	Trace	Trace	5	5	
Odor, hot	2 veg.	1 veg.	1 veg.	1 veg.	
Odor, cold	1 veg.	1 veg.	1 veg.	1 veg.	
Turbidity	Trace	5.	Clear	Clear	
Solids, total	145.	145.	132.	155.	
Loss on ignition	37.	35.	25.	26.	
Mineral residue	108.	110.	107.	129.	
Nitrogen as:					
Ammonia free	.050	.012	.012	.006	
Ammonia albuminoid	.046	.030	.044	.040	
Nitrites	.002	.001	.001	.001	
Nitrates	0.50	0.30	0.40	0 20	
Oxygen consumed	0.80	3.10	60	1.00	
Chlorine	2.50	3.25	3.00	2.75	
Hardness, total	105.8	100.	101.5	114.2	
Alkalinity	103.	98.	101.	96.	
Bacteria per c.c	275.	2,400.	200.	800.	290.
B. coli type:					
10 c.c	Present	Absent	Present	Absent	Present
1 c.c	Absent	Absent	Absent	Absent	Absent
1/10 c.c	Absent	Absent	Absent	Absent	Absent

Collected on	12/27/10	4/5/11	5/31/11	7/6/11	8/31/11	
Collected from	Municipal supply	Municipal supply	Municipal supply	Municipal supply	Municipal supply	
Color	3	20	15	15	20	
Turbidity	Trace	Trace	5	1	10	
Odor, cold	1 veg.	1 veg.	1 veg.	1 veg.	1 veg.	
Odor, hot	2 veg.	2 veg.	1 veg.	2 veg.	1 veg.	
Solids, total	60.	44	50.	48	52.	
Loss on ignition	28.	20.	23.	13.	13.	
Mineral residue	32	24.	27.	35.	39.	
Nitrogen as:						
Free ammonia	.054	006	.016	002	.004	
Albuminoid ammonia	.086	.070	.072	.038	.036	
Nitrites	.002	.003	.001	.001	.002	
Nitrates	0 30	0.10	0 20	0.20	10	
Oxygen consumed	3 90	3 80	2 10	0 20	2 70	
Chlorine	0.50	1.50	1.00	0 50	.50	
Total hardness	26.	22.1	26.	19 50	27.3	
Alkalinity	24.	14.	24.	18.	26.	
Bacteria per c.c	550.	1,500.	400.	7,500.	350	4.
B. coli type:						
10 c.c	Absent	Present	Present	Present	Present	
1 c.c	Present	Absent	Absent	Absent	Absent	
1/10 c.c	Absent	Absent	Absent	Absent	Absent	

as distinguished from the Kingsboro supply is generally a very of surface water. The nitrogen present is generally low in am other indications of organic matter suggest that the presence decomposable material is found comes from swamps and swampy than from animal contamination. The number of bacteria is sor as on May 31, 1911, when the number reached 7,500, or again, a 23, 1911, when the number reached 4,100; but generally, the nu from 300 to 600. The unusual number of bacteria present on th is probably due to a rainfall preceding the collection of the san number usually found is not high considering the steep waters lack of sedimentation. Colon bacilli are found usually in 10 c. c. not in smaller quantities. While the presence of the colon bacill animal contamination, it is not possible to differentiate between

other animal wastes by this means, and, in view of the fact that the area of the watershed contains a number of pastures, it is more than probable that these bacteria are due to this use of portions of the watershed. The water is notably soft compared with waters from other parts of the State, the total hardness ranging from 19 to 27. It is probable that the efforts of the water board to gain control of the watershed and to eliminate cottages and temporary camps on the steep hillsides where any wastes must be quickly carried into the streams will result in improving the chemical appearance of the water. There is no reason, however, from the analyses, to suspect the water of being responsible for a high general death rate nor for irregularities in either that rate or the typhoid fever rate.

The Kingsboro supply is not equally satisfactory with the municipal supply. The hardness is much greater. The watershed is small and the appearance of the pond as the writer saw it in August would condemn the water at that time merely from its appearance. The Kingsboro water comes from springs, which accounts for the hardness, and, except on account of the rapid drainage from the surrounding hills, should be a good water. In dry seasons, however, the water is practically exhausted. Algae and other weeds develop, a conspicuous taste and odor can be noted and the general conditions of topography in the vicinity of the reservoir are not to be commended.

Conclusions

1. Gloversville is a thriving city, given up industrially to the manufacture of leather and leather gloves. The factory work is of a sort commonly done by women, and a large proportion of the female population is thus employed.
2. The general death rate of the city is apparently low and noticeably lower than the corresponding rate for the State as a whole. For the past five years, however, the difference between the two rates has been steadily growing less.
3. The birth rate in Gloversville is very low and therefore the number of children in proportion to the total popualtion is low. Since one-third of all deaths occur among young children, the relative paucity of children explains, partly, at least, the apparently low death rate. When a correction to the general death rate of Gloversville is made, on account of the number of children, the rate becomes as large or larger than that of the State.
4. The death rates of typhoid fever, while subject to wide variations, do not indicate conditions producing constant infection. Occasionally during some one year, five or six deaths and ten times that number of cases occur, but the next year the number of deaths drop to the normal one or two. During the past three years the rate has been low, 10 per 100,000, but in 1909 it was high.
5. The water supply is from the surface of a side hill north of the city, a portion coming from a shallow and somewhat swampy creek, the water of which is inferior to the rest of the supply. The water board has adopted the policy of acquiring the property on the watershed and of planting such areas, in order to protect and conserve the run-off. It is possible that in the past there may have been pollution in the water from camps and cottages on the hills above the streams and reservoirs, but it is believed that this danger is now at an end. The waters of Mayfield creek are not of as good quality as the rest of the supply and would be improved if they could be made to pass through a large reservoir before entering the city mains. The quality of the water from the municipal supply, as shown by chemical analysis, is generally good, although occasional high bacterial counts show the presence of surface wash.

Recommendations

1. In view of the increasing death rate of the city and of the occasional high rates from typhoid fever and among children, it is recommended that the local board of health consider possible means of improving the general standards of sanitation in the city. This may include a more systematic examination of the milk supply, regular inspection of meat and of bakeries, the elimination of privies and cesspools, closing up shallow wells, an examina-

tion and possible improvement of housing and factory conditions, together with the enforcement of legislation dealing with women and child labor.

2. It is recommended that the water board continue their policy of gaining control of the watershed as rapidly as possible and that the planting be continued; that the patrol of the watersheds during the summer should be maintained so that pollution from campers may be prevented; that special inspection be made of the Mayfield creek with particular reference to possible pollution at Jackson Summit.

3. It is recommended that steps be taken by the Kingsboro Water Company to prevent contamination from the hillside above their supply entering their reservoir.

Respectfully submitted,
HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the other city authorities urging that steps be taken to carry out the recommendations contained in the report.

JAMESTOWN

ALBANY, N. Y., *June* 24, 1912.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on the sanitary conditions of the city of Jamestown, particularly as affected by the quality of the water supply. The visit to Jamestown on which this report is based was made in August, 1911, and the studies of statistics have been made and the report written during the month of May, 1912.

The city of Jamestown is situated at the southern end of Chautauqua lake, 68 miles southwest of Buffalo. It is 7 miles from the northern border line of Pennsylvania and 25 miles from the western line of Pennsylvania. It is the only city in the southwestern corner of New York and has the advantage of being the commercial center of a large area as well as having the importance which comes from its own manufacturing interests. The outlet of Lake Chautauqua is through the Chadakoin river and the city is about two miles from the lake on the river, which has been canalized to allow steamboat traffic on the lake to tie up at city docks. Little use, however, is made of the lake for transportation except for summer pleasure riding.

The main railroad communication to and from Jamestown is by the New York, Lake Erie & Western railroad, Jamestown lying about half way between New York and Chicago. A branch of the Erie railroad also extends from Jamestown to Buffalo for the sake of the Buffalo traffic. The Jamestown, Chautauqua & Lake Erie railroad is a small local line running between Jamestown and Chautauqua, passing around the north end of the lake where it connects with the Pittsburg division of the Western New York and Pennsylvania railroad. There is also a small line known as the Dunkirk, Allegheny Valley and Pittsburg railroad extending north and south which passes through Falconer three miles east from Jamestown. There are also electric lines running from Jamestown to Lake Erie on the north and to Warren, Pennsylvania, on the south.

The topography of this corner of the State is rugged and even mountainous, the valleys, however, being flat and wide, and the streams in them meandering from side to side with many turns. The Chadakoin river has only a narrow valley, not widening until beyond Falconer, it joins with the Cassadaga creek and the Conewango creek, both of which valleys are at least a mile wide. The hills on each side of the Chadakoin river rise from 200 to 300 feet above the river, the city extending well up the slopes. The sur-

face drainage is therefore easy and the river is the natural receptacle of all the refuse from the residences and factories in the place.

Chautauqua lake has an area of about 18 square miles and a watershed of about 207 square miles. The lake acts as a storage reservoir, giving uniform flow through the outlet so that the factories at Jamestown are able to take full advantage of the water power furnished there. The fall in the river from the lake to Falconer is about 50 feet, divided into several water powers.

According to the 1900 census Jamestown then ranked seventeenth in population and seventeenth in the value of manufactured products among the cities of the State. This indicates that it is normal when compared with other places of the State and cannot be considered pre-eminently as a manufacturing city. The fact that natural gas from Pennsylvania is piped into the place and that the waterfall gives cheap power would seem to invest Jamestown with possibilities of gradually increasing manufacturing development.

Although incorporated as a village in 1827 and chartered as a city in 1886, the growth has been slow but continuous. The population in 1890 was 16,000 and in 1910 32,000, the increase amounting to double the population in 20 years. The area of the city is such that there is no apparent congestion of population and no quarter of the city was markedly dirty and insanitary. A large proportion of the population are of Swedish birth or descent.

The woolen mills are at present of the greatest commercial importance, employing about 2,000 operatives in three separate concerns. There are also furniture factories of large size. The presence of the woolen mills involving the use of dye stuffs and the wastes of wool scourings are of serious importance in the matter of the condition of the river and the effect of the discharge of such material into the river is plainly visible from the point where the first one enters to a point far below the limits of the city. Some years ago the appearance of the stream and the odors emanating therefrom were so objectionable to the esthetic sense of the residents that the main trunk sewer which up to that time had discharged into the river was extended easterly some three or four miles until it emptied into the river below Falconer.

Vital Statistics

The general death rate of the city for the past 22 years has an average value of 12.7 — a rate which is remarkably low when compared with the rest of the State. Thus the death rate for the State as a whole in 1911 was 15.3 and for the 10-year period, 1900 to 1909, was 16.9. Table 1 gives the population, the number of deaths and the death rates for 1,000 population in Jamestown for the period 1890 to 1911, and Fig. 1 shows the rates plotted graphically with similar rates for the State as a whole for comparison. The striking contrast between the rate for the State and for the city is the most noticeable feature of the chart, the city rate being three or four deaths per thousand below the State rate for the entire period since 1896. In 1893 for some reason the number of deaths in Jamestown was high but since that time no such abnormal death rate has appeared and no tendency toward an increase in the death rate can be discerned.

TABLE 1

Showing the Population, the Number of Dea… Rate per 1,000 in the City of Jamest… Inclusive

YEAR	Pop
1890	[illegible]
1891	[illegible]
1892	[illegible]
1893	[illegible]
1894	[illegible]
1895	[illegible]
1896	[illegible]
1897	[illegible]
1898	[illegible]
1899	2[illegible]
1900	2[illegible]
1901	[illegible]
1902	24
1903	24 [illegible]
1904	[illegible]
1905	[illegible]
1906	[illegible]
1907	[illegible]
1908	[illegible]
1909	[illegible]
1910	31 [illegible]
1911	32 [illegible]
Average	

It is of considerable interest to know why the deat… should be so much below that of other parts of the State… rates in 1896 and in 1902 and 1906, when the rates were… one is obliged to ask whether the apparent healthfulness… be untrue and the appearance be caused by lack of accu… deaths. Professor Willcox, statistical expert for the Un… Bureau, declares that whenever in any city the death r… the accuracy of the statistics must be questioned. He q… referring to the death rate in Buffalo, on this point a… probabilities are at least 50 to 1 that the death rate ha… 16 per 1,000 per annum." Mr. Willcox himself says, refer… rate of 13 per 1,000 in Ithaca: "To one knowing not… statistics this death rate, which was one of the lowest in t… that Ithaca was a remarkably healthy town, but to one havi… of the subject and of the probabilities in the case, this figur… to be incredible and to put one on inquiry as to its accurac… showed that in about half the cases of deaths in Ithaca the… registration) was violated and that in about one-quarter of t… of the deaths was ever made or reported to Albany." The t… of Ithaca was shown to be not below 16.5 per 1,000 instead of … was claimed. In the light of such criticism of two such aut… rates in Jamestown of 10.2 and 10.7 must at least suggest the… inadequate registration.

So far as the inspector could note there were in Jamestow… conditions so superior to those existing in other parts of the… suggest healthful conditions so manifest. The older portion of t… the river is crowded together and somewhat congested. Some o… ings are built out over the river and river water is, sometimes at… in these buildings instead of the regular water supply of the c… is a large proportion of population of the working class whose…

Figure No. 1

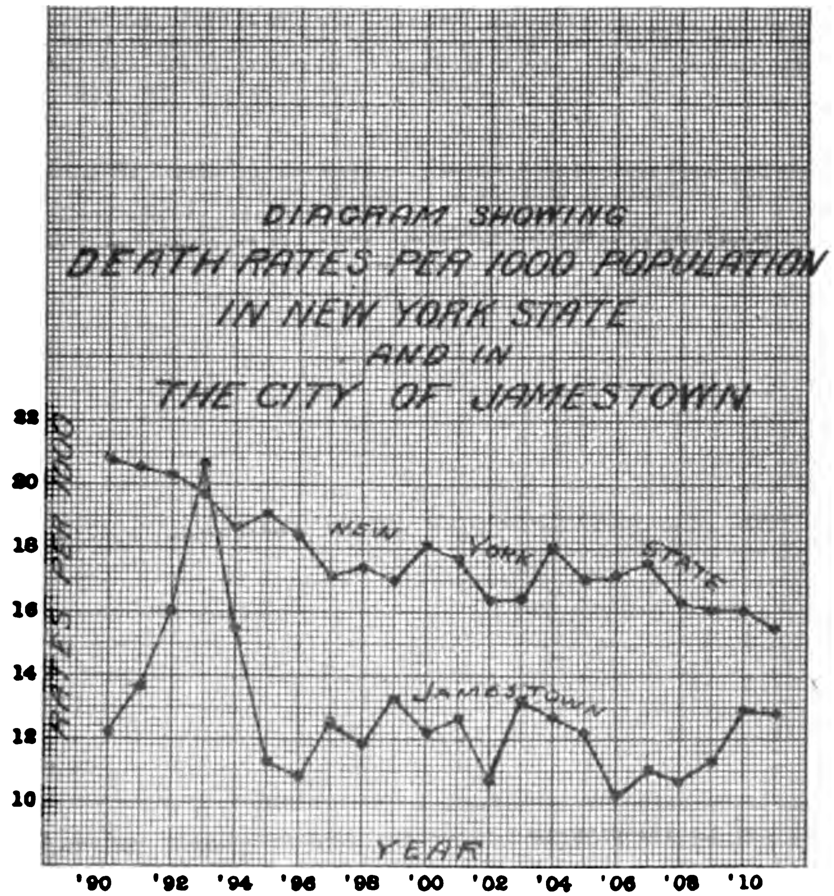

DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF JAMESTOWN
RATES PER 1000
NEW YORK STATE
JAMESTOWN
YEAR
22
20
18
16
14
12
10
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

of sanitation must be assumed to be of a low order and it is hard to believe that under such conditions a low death rate can be steadily maintained year after year.

In respect to typhoid fever Jamestown does not have so enviable a record. Table 2 shows the population of the city, the deaths from typhoid fever and the death rates per 100,000 population for the past 21 years, and Fig. 2 shows these rates plotted together with similar rates for New York State. It will be noted that the peaks of the irregular curve for Jamestown are far above the line for the State and that the variations and irregularities of the Jamestown curve are very marked. The average for the 20-year period in Jamestown is 30.6, the years 1897 and 1903 being years when only one death occurred and where the corresponding rate was very low. The highest rate was in 1904, with 16 deaths at a rate of 62.7. However, this was nearly equalled in 1891 when 10 deaths gave a rate of 57.7.

TABLE 2

Showing the Population, the Number of Deaths from Typhoid Fever and the Death Rate per 100,000 Population in the City of Jamestown for the Years 1890 to 1911 Inclusive

YEAR	Population	Number of deaths from typhoid fever	Death rate per 100,000 population
1890	16,038	7	43.6
1891	17,332	10	57.7
1892	18,627	10	53.1
1893	19,160	10	52.1
1894	19,693	7	35.5
1895	20,226	4	19.8
1896	20,759	3	14.5
1897	21,292	1	4.7
1898	21,825	5	22.9
1899	22,358	9	40.3
1900	22,892	9	39.3
1901	23,545	6	25.5
1902	24,198	1	4.1
1903	24,852	6	24.1
1904	25,506	16	62.7
1905	26,160	6	22.9
1906	27,187	9	33.1
1907	28,214	5	18.0
1908	29,241	5	17.1
1909	30,269	5	16.5
1910	31,297	9	28.8
1911	32,329	12	37.1
Average			30.6

It has been found by experience and statistics that it is quite possible, in cities where proper supervision is exercised over the quality of the water and milk supplies in the northern part of the United States, to maintain a typhoid fever death rate below twenty and it is not unreasonable to expect that rate to be reduced one-half as sanitary progess gains further headway. The average rate, then, for Jamestown is at least double what it should be and if the city is to have its reputation for healthfulness maintained it must ascertain the cause of the unusual number of typhoid fever deaths and take steps to remove the conditions responsible for them. Considering the number of deaths and the size of the city, four deaths from typhoid fever should be a maximum number and any number of deaths greater than this should be cause for alarm and for great activity on the part of the local board of health. In 1911 there were 12 deaths, 8 more than any city of the size of Jamestown should have, and in the 22-year period there have been 18 years when more than 4 deaths have been recorded.

Since 1 death is generally accompanied by abo
fatal it seems that if by a proper institution of h
of deaths from typhoid fever had been held down
last 21 years 72 deaths and about 720 cases of
would have been prevented. If the usual value
$5,000, according to the evidence of statistical ex
to the city from these 72 deaths has been $360,000
from the accompanying cases of illness, the total l
been not far from $1,000,000. From the money
good reason for believing that it would be worth wh
town to take some cognizance of the presence of t
for its health board to indicate its interest in th
officials to provide the necessary funds for studyi
the residents as a whole to demand that such a st
there were 5 deaths from typhoid fever; in 1910, 9 de
the number increasing from year to year apparently
the local health authorities. Before the record for 1
fore the usual fall outbreak occurs the onset should be

In a small city the tabulation of statistics and the
therefrom are not as conclusive as in larger cities, sinc
traction of a single death may change materially the
be drawn from the statistics. But in the case of Jam
of three or four deaths from this disease each year wou
it is not accidental but that the high rate is due to lo
should be investigated. In the State as a whole, the ef
authorities and the greater appreciation of sanitary tru
gradual reduction in the typhoid fever death rate. In 18
and in 1911 it was 14.7 — reduction of more than one-h
accomplished gradually year by year. The curve for the
shows this marked downward tendency. In Jamestown, h
such tendency and the increase in the number of deaths sin
cation that the forces at work and responsible for the pre
ease are not yet brought under sanitary control.

The cause of typhoid fever has generally been found to
water or infected milk, the latter causing in general not ov
the total number of deaths. Recently, also, much stress ha
ticularly in southern States, on the possible transmission
flies from infected material in drains or privies or polluted st
possible without further investigation to say to which of
occasionally large number of deaths and presumably the man
cases of typhoid fever in Jamestown have been due and it mu
local health authorities to so examine the local conditions, th
roundings of the residences, the character of the milk distr
quality of the water supply, as to be sure that they have ta
caution to prevent a further recurrence of an excessive amou
ease, and, if possible, to reduce the amount now existing. It
that the deaths reported do not result from diseases originat
town, but, on account of the existence of peculiar hospital facili
if not most of them brought in from the surrounding country
railroad. In this case, of course, no accompanying cases of il
found in the city and the previous history of the cases would
localities where infection is likely to have occurred.

The use of well water in a community where the subsoil has be
time the receptacle of human wastes is another potent cause of t
and the fact that river water is available in many of the mills a
suggests the possibility of river water being ignorantly or carele
such a way as to afford entrance for the typhoid germ into the
tem. It is possible, also, that connections exist between the spr
tem of the factories using river water supplied by pressure pum
one side and the city mains on the other. In other cities it has
that where such conditions as these exist, the back pressure valv
city water pipes are not tight so that when the fire pumps are tu

Figure No. 2

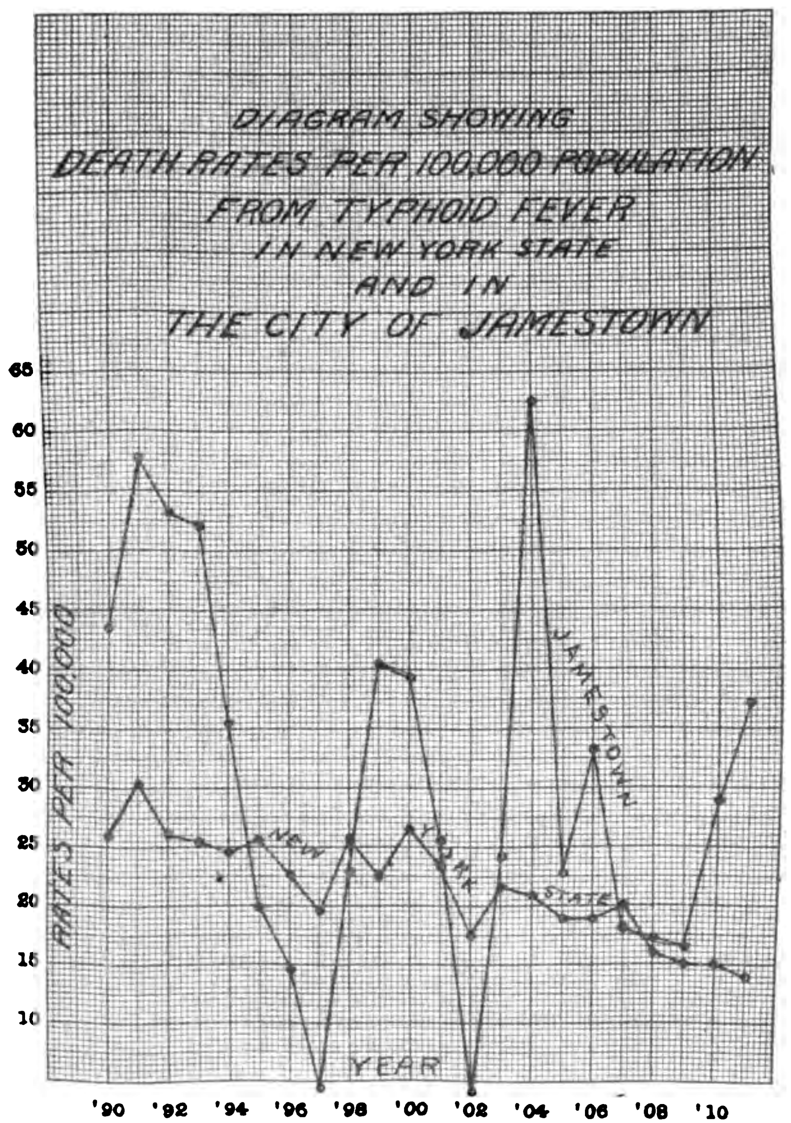

DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF JAMESTOWN
RATES PER 100,000
65
60
55
50
45
40
35
30
25
20
15
10
NEW YORK STATE
JAMESTOWN
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

and the pressure raised in the sprinkling system above that in the city mains, some of the river water passes into the mains, carrying with it germs of disease.

Turning to the deaths of children under five, it may be seen that while the average death rate at that age per 10,000 population is 23.9, there is a wide variation from that average in the several years. Since 1894, however, the rate has not been more than 40 and, except in 1911, not over 30. The average rate in the United States and also in Massachusetts and in New York State is not far from 50 per 10,000, so that Jamestown, with a rate of 28.9, is below the normal, and insofar as these figures indicate the health of the community, Jamestown is better off than the State as a whole. This rate, however, for a proper interpretation, should be based, not upon the total population, but upon the number of children under five years old, since manifestly, if a majority of the population are adults, the death rate of children under five would be low in comparison, merely because of the small number of children among the total population. Thus, in Austria, where the birth rate is about 35, the deaths of children under five were in a certain year 46 per cent. of all the deaths, while in France, where the birth rate is 21, the deaths of children were only 23 per cent. In Jamestown, in 1910, the birth rate was 21 and in 1911 it was 32.5, the average rate among other cities of the State of approximately the same population being 21.8, showing that there are no abnormal conditions in Jamestown insofar as the birth rate is concerned, and that, therefore, there should be the average number of children among the total population.

TABLE 3

Showing the Population, the Number of Deaths of Children under Five Years and the Death Rate per 10,000 *Population in the City of Jamestown for the Years* 1890 *to* 1911 *Inclusive*

YEAR	Population	Number of deaths under 5 years	Death rate per 10,000 population
1890	16,038	50	31.2
1891	17,332	52	30.0
1892	18,627	77	41.3
1893	19,160	122	63.6
1894	19,693	79	40.1
1895	20,226	76	37.6
1896	20,759	60	28.9
1897	21,292	62	29.1
1898	21,825	58	26.6
1899	22,358	55	24.6
1900	22,892	63	27.5
1901	23,515	51	21.7
1902	24,198	53	21.9
1903	24,852	67	27.0
1904	25,506	58	22.7
1905	26,160	63	24.1
1906	27,187	53	19.5
1907	28,214	47	16.7
1908	29,241	55	18.8
1909	30,269	65	21.5
1910	31,297	87	27.8
1911	32,329	107	33.1
Average			28.9

In the last six years in New York State the ratio of deaths under five to total deaths has ranged between 27.3 per cent. and 27.9 per cent., that is, a little more than one-quarter of all the deaths were under five years old. Table 4 shows the total number of deaths, the number of deaths under five and the percentage of the latter to the former in Jamestown for the last five years, and although none of the percentages are as high as the normal of the

State, there is a marked and constant increase from
most serious and the tendency here indicated should
ties to make immediate inquiry into the cause of th
is always significant to find a high death rate among
particularly susceptible to organic impurities in wat
pure or tainted food and to crowding in unventilated

TABLE 4

Showing the Total Number of Deaths, the Number of the Percentage of the Latter to the Former in the the Years 1907 *to* 1911 *Inclusive*

YEAR	Total deaths
1907	310
1908	312
1909	342
1910	404
1911	414

One of the greatest causal factors in infant mortality is
orders classified as diarrhea and enteritis. In the regist
United States in 1910, 39 per cent. of the children unde
corded as having died of these diseases. About 35 per cent
in this group occur in children under two years of age a
conceded that certain etiological factors, not bacterial in n
responsible for the prevalence of these infant diseases. Th
of climate upon enteritis is acknowledged, since cholera
understood to be a summer disease. The racial characteris
population and of certain classes of immigrants seem to affe
also. But perhaps the most important factor in the preval
is the well known influence of the slums of the large cities ar
of woman labor in mill and factory towns. A large part is
and water impurities and if one could eliminate the enteriti
and milk, we should have in the death rates from that dis
index of any city's sanitary condition. Certainly a city wh
to have slums, and which, in spite of a good water supply, has
rate, has, in all probability, insanitary conditions which are
different from the slums of the large cities, at least in their eff
mortality.

Table 5 shows the death rate from enteritis under two years
for the past five years and it is to be noted that in 1911 it ha
figure of 68, although in 1907 it was only 21.3.

TABLE 5

Showing the Death Rate from Enteritis under Two Years in Jamestown for the Years 1907 *to* 1911 *Inclusive*

YEAR
1907
1908
1909
1910
1911

For comparison the following table from a bulletin of the United States Public Health and Marine Hospital Service, written by Mr. A. J. McLoughlin, gives the death rates from typhoid fever and from enteritis in the Michigan cities with notes as to the water supply. The three cities at the end of the list, Pontiac, Ann Arbor and Manistee, which have a good water supply, have low rates from both typhoid fever and enteritis; also Lansing, Kalamazoo and Jackson are marked as having good water supplies, although the death rate would indicate either a questionable quality of water or of some other insanitary conditions.

TABLE 6

Showing the Average Death Rates per 100,000 from Typhoid Fever and from Enteritis in Michigan Cities with Notes as to the Water Supply 1905–1910

CITIES	Typhoid fever	Enteritis	Water supply
Escanaba	136.0	185.0	Polluted
Sault Ste. Marie	52.3	134.6	Good
Alpena	46.7	162.6	Polluted
Ironwood	43.5	124.5	Doubtful
Port Huron	42.0	78.6	Polluted
Flint	43.0	63.0	Polluted
Traverse City	42.0	53.5	Polluted
Bay City	37.3	50.3	Polluted
Lansing	33.3	56.6	Good
Battle Creek	31.3	44.0	Doubtful
Kalamazoo	29.5	59.0	Good
Jackson	28.3	45.5	Good
Muskegon	24.7	59.8	Doubtful
Saginaw	24.6	42.0	Wells safe; river polluted
Pontiac	24.5	44.0	Good
Ann Arbor	22.1	18.6	Good
Manistee	20.8	48.0	Good

In Jamestown, in 1911, the enteritis deaths of 62 and the ratio of deaths under five to total deaths of 25.8 suggest vividly the dangerous possibilities if the tendency shown in these tables is not checked. Unfortunately, time did not permit the inspector to remain in Jamestown long enough to follow up the indications here made and to determine the actual cause of the high rates here given. It will be necessary for the local authorities to consider by locality each specific death and determine, if possible, the cause of such death. Thus, by comparing conditions in 1911 and in 1907 and weighing the effect of changes responsible for the increased number, it may be possible to take such steps as shall prevent any further increase in the deaths of children, so significant in the estimation of the sanitary condition of the city.

So far as could be learned, the city has no conditions of drainage or of living which will by superficial examination account either for the sporadic epidemics of typhoid fever or for the upward tendency of the curve showing the deaths from children's diseases. It would seem, however, that there must be present in Jamestown conditions which have interfered and are still interfering with the lowering of death rates from preventable diseases, this tendency being notably present in the State as a whole. It would also seem that there must be present in the city, not under full control by the sanitary authorities, conditions which cause unquestionable and sporadic variations in the death rates from typhoid fever and from diarrhea and enteritis. It is manifestly the duty of the health authorities to determine the cause of these variations and to take such steps as shall bring them under control.

Water Supply

The water supply of Jamestown was installed by a]
the city, however, having since purchased the plant
the supply consists of fifteen driven wells in the vicin
miles northeast of the northeast corner of Jamestow
low-lying meadow adjacent to the Cassadaga creek
empties into the Chadakoin river, the meadow being
the creek water. (See Fig. 4.) The wells are c
84 feet through clay into gravel. These fifteen wells
and discharge through a 12-inch main, which is laid
into a circular well 43 feet deep. The water stands in
heights but always within reach of the suction of the
by the Allis engine at the station. The pumping statio
the water through a 16-inch main, about two miles to the
is in the northeastern corner of the city and which hol
This reservoir is a circular one with concrete walls and
iron roof. By the side of this reservoir is the city pump
with Holley and Haskell engines and pumps which, by
charge water into the city mains at an ordinary pressu
At the time of the writing of this report, extensive in
water system are being made chiefly, however, because of
shown by the dry seasons and by the continued growth o

At the site of the wells, two points may be noted as bea
of the water supply. First, although it is believed by th
no contamination of the artesian water is possible, it mu
that at certain times of the year the ground in which the
tained is covered several feet deep by the creek water and b
the latter being grossly polluted. The fact that the water
wells stands at a lower level than the creek gives consider
which the creek water or the surface water would have gre
flow into the well if any openings or other slight imperfect
sonry allowed.

Second, the condensing water in the pumping station comes
the creek and the boiler feed pump is also connected to the
though there is a branch leading into the pump main. It
the engineer at the station that a system of valves made it
the pumping main through the boiler feed pipe to receive an
and also that there was no connection between the condensing
supply main. It is mentioned only as indicating a possible cau
ties in the water supply not otherwise to be accounted for.

The analyses show unusually good water with but few interr
general good quality. (See Table 7.) The solids are small,
mineral in character, so that the organic residue is correspondi
amount. The nitrogenous, undecomposed organic matter, as
the albuminoid ammonia, is low and uniform. The free ammonia
but subject to some variation, the amounts ranging from .006
1911, to .047 on March 5, 1912. The nitrites are low and the n
scarcely any measurable amount. The indication of the latter is
able to the long-time purity of the water and to the absence of o
ter in the various strata through which the water has passed. T
on June 7, 1911, was unusually high, although in other respects n
in the quality of the water can be observed and it is probable that
excess has no serious import. The water, bacteriologically, is gene

1/30/11
Trace
Trace
1 veg.
1 veg.
128.
21.
107.
.020
.026
.001
Trace
0.50
2.50
97.1
89.
230.
Absent
Absent
Absent

3/5/12
Trace
Clear
1 veg.
1 veg.
120.
13.
107.
.047
.020
.001
0.02
0.50
3.
95.7
81.
30.
Absent
Absent
Absent

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TABLE 7

Report of Water Analyses of the City of Jamestown

Collected on	4/8/08	1/22/09	3/23/10	10/10/10	11/15/10	1/30/11	4/15/11	6/7/11	11/2/11	12/7/11	3/5/12
Color	2	1	Trace	Trace	....	Trace	Trace	Trace	5	Trace	Trace
Turbidity	Clear	1	Clear	Trace	....	Trace	Clear	Clear	Clear	Clear	Clear
Odor, cold	....	....	....	....	....	1 veg.	1 veg.	1 veg.	1 veg.	1 veg.	1 veg.
Odor, hot	....	....	....	....	....	1 veg.	2 veg.	1 veg.	1 veg.	1 veg.	1 veg.
Total solids	124.	132.	123.	124.	....	128.	153.	122.	131.	126.	120.
Loss on ignition	....	....	....	....	....	21.	45.	12.	21.	22.	13.
Mineral residue	....	105.	112.	99.	....	107.	108.	110.	110.	104.	107.
Nitrogen as											
Free ammonia	.018	.038	.016	.004	....	.020	.006	.010	.024	.008	.047
Albuminoid ammonia	.022	.034	.020	.012	....	.026	.028	.014	.036	.016	.020
Nitrites	.001	Trace	.003	.002	....	.001	.001	.001	.001	.002	.001
Nitrates	Trace	Trace	Trace	Trace	....	Trace	Trace	Trace	Trace	0.04	0.02
Oxygen consumed	.025	0.15	0.80	0.10	....	0.50	0.70	0.20	0.40	0.10	0.50
Chlorine	2.25	2.37	2.	2.50	....	2.50	3.50	11.50	2.50	3.	3.
Total hardness	86.2	91.4	92.9	98.6	....	97.1	94.3	94.3	85.7	87.1	95.7
Alkalinity	....	75.5	81.	88.	....	89.	87.	83.	85.	85.	81.
Bacteria per c.c	....	12.	190.	2,000.	50.	230.	10.	10.	60.	3,500.	30.
B. coli type:											
10 c.c	....	Absent	Absent	Present	Present	Absent	Absent	Absent	Present	Absent	Absent
1 c.c	....	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent
1/10 c.c	....	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

but on two occasions, namely, October 10, 1910, and December 7, 1911, the number of bacteria was in the thousands, as shown. On the latter date, it may be noted that the sample was two days in transit and the bacterial count was probably unduly high for that reason. Bacteria of the B. coli type are generally absent, in fact, are found in only three cases and then in large (10 c. c.) samples only. The evidence, then, is entirely in favor of the good quality of the water and whether reference is made to particular infection or to the organic content of the water, it is not likely that the death rates in Jamestown are affected from this source.

Conclusions

1. Jamestown is an important commercial and manufacturing center of the southern part of the State. No marked congestion of population was noted nor were any conditions of uncleanliness observed likely to affect the death rate.

2. The general death rate is very low, so low, that the question is invited as to the accuracy of the registration and reports. The figures of the city registrar show about 4 deaths per 1,000 less than the average of the State and the reason is not apparent.

3. The death rate from typhoid fever is irregular and at times unduly high, showing the influence of some abnormal conditions, causing typhoid fever without affecting the general death rate. In 1911, particularly, there were

three times as many deaths from typhoid fever as shoul
town, were sanitary conditions perfect. The fact that h
curred in these last years, when generally the prevalence o
diminishing, is or should be a cause of alarm among those
good health of the city.

4. The death rate among young children is apparently low
the low general death rate, the apparent healthfulness of th
regarding the question of the accuracy of registration figur
the percentage of such deaths is rapidly increasing is m
alarming.

5. The death rate from diarrhea and enteritis is generally
for children under two years of age of 62 (1911) is an unmis
of insanitary housing or food conditions, and should demand
detail by the local sanitary authorities.

6. The water supply comes from artesian wells and the
State Hygienic Laboratory indicate, with scarcely any excepti
purity. The occasional deviation of parts of the analysis f
normal of good quality may be due to floods on the well area
duction into the distribution system of small quantities of
river or creek, to the long journey of the water to the laborat
change in the character of the water itself.

Recommendations

1. It is recommended that the local board of health, acting
22 of the Public Health Law, take under careful consideration th
registration of deaths and adopt measures, if necessary, to incre
ent accuracy.

2. It is further recommended that the same board, acting un
21 and 24 of the Public Health Law, shall duly consider the p
typhoid fever and of children's diseases in Jamestown, with a vi
mining, if possible, the cause of the present excess over the nor
State and of reducing the death rates from these diseases to a low

3. It is further recommended that the board of water commiss
steps to determine whether the quality of water in the city mains
by floods in the Chadakoin river or by the presence and use of fir
the factories, and if so, that they shall protect the people of James
such polluting influences.

Respectfully submitted,
HENRY N. OGDEN,
Special Assistant E

Copies of this report were inclosed in letters addressed to the
water commissioners and to the other city authorities urging that
taken to carry out the recommendations contained in the report.

LITTLE FALLS

ALBANY, N. Y., *May* 15,

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on t
tary condition of the city of Little Falls, particularly as affected
quality of the water supply. The visit to Little Falls on which this
is based was made in August, 1911, and the studies of statistics hav
made and the report written during the month of March, 1912.

The city of Little Falls lies on the Mohawk river seventy miles w
Albany at the point where the river breaks through the Adirondack
and thus reverses the direction of the pre-glacial drainage. The hills
close in and the meadows, which have bordered the river from Rome, ce
exist, so that the stream is confined in a narrow, rocky and pictur
valley. The city extends from the river northerly about half a mile, r

400 feet in this distance, one of the characteristics of the city being the uneven topography of the site. Between the city and the river the New York Central railroad is located, and on the south side, crowded between the water and the cliffs, are the Erie canal and the West Shore railroad. On each side of the city a small stream finds its way in a marked depression or gulley down the hillside into the river.

The Mohawk river has a rapid descent at this point, the fall amounting to about forty-five feet from the surface of the pool above the State dam down to slack water below the lower falls, a distance of about half a mile. A number of dams make water power available for different factories and about 1,300 horsepower is generally utilized. Because of this water power a large amount of manufacturing is carried on in this city, chief among which may be mentioned a number of knitting and shoddy mills, paper mills, grist mills and saw mills, besides a number of smaller factories making bookcases, patent medicines, soap and food preparations. According to the 1900 census Little Falls ranked thirty-seventh among cities of the State in population and was thirtieth in rank, based on the value of manufactured products. This indicates in part the large amount of manufacturing going on proportionately in the city and suggests the possibility of the result of such factory life on the health of those employed. In the early days Little Falls was one of the most important cities along the line of the Erie canal, but for various reasons it has not grown as have Syracuse and Utica. It may be that the transportation facilities offered by the new Barge canal will give an impetus to the development of the city and that in the future it will increase in size and importance beyond its present state.

The sewers of Little Falls are on the combined system, their construction having been commenced in 1899. About 90 per cent. of the city is said to be connected with the sewers and the steep grades of the streets make the disposal of surface water a simple problem. Sewage is discharged without treatment directly into the Mohawk river.

Vital Statistics

The average general death rate per 1,000 population in Little Falls since 1890 is 14, although for the past three years the rate has been above 15. Table 1 shows the population, the number of deaths annually in the city and the death rate per 1,000 for the 22 years 1890–1911 inclusive. It will be noted that the minimum death rate, 8.6, occurred in 1902, and that the maximum rate at any time during this period was in 1892, when it reached the figure of 20.

Figure 1 shows the general death rate of New York State for the past 22 years as well as the death rate of Little Falls and the difference between the two curves may well be studied. The greater smoothness of the curves of the State is due, without doubt, largely to the greater population and the greater number of deaths involved, but the marked unevenness of the curve for Little Falls can hardly be accounted for by the size of the city. That the death rate should vary from 16 in 1900 to 8.6 in 1902 cannot be explained by the inequality of the number of deaths from constitutional diseases occurring in even so small a city as Little Falls. There must be other forces concerned which are sporadic in action and which naturally suggest forces at work which cause epidemic or at least preventable diseases. Similarly the difference between the rates in 1892 and in 1893 are so striking as to further suggest the operation of preventable causes. Again, it may be observed that the death rate curve for the State shows a continual downward tendency, the highest rate being in 1890 (20.8) and the lowest in 1911 (15.5), and this downward tendency is without question due to the greater knowledge of sanitation prevailing to-day and to the greater sense of responsibility on the part of State officials and particularly the board of health. In the curve for Little Falls no such downward tendency can be seen. In fact, since 1902, the upward tendency of the curve is much more noticeable. In the last year, 1911, for the first time in the entire period, the death rate for the city is higher than for the State as a whole.

TABLE 1

Showing the Population, the Number of Deaths Annually an
per 1,000 *in the City of Little Falls for the Years* 1890–

YEAR	Population	Nu of d
1890	8,500	
1891	8,688	
1892	8,876	
1893	9,064	
1894	9,252	
1895	9,440	
1896	9,628	
1897	9,816	
1898	10,004	
1899	10,192	
1900	10,381	
1901	10,529	
1902	10,677	
1903	10,827	
1904	10,973	
1905	11,122	
1906	11,352	
1907	11,582	
1908	11,812	
1909	12,042	
1910	12,273	
1911	12,579	
Average	....	....

The death rate in New York, however, is relatively high w with other States, its rate being as high as second and nev fifth among registration States. In Michigan, for example, the between 13 and 14 and in Indiana between 12.5 and 13.5.

Compared with other cities of the State in late years the Falls has also been high. In 1911, for example, the rate of t whole was 15.4 — 1.4 lower than that of Little Falls, and 29 State had lower rates than 16.8. There is also the question, sug low rate of 1902, whether the returns from Little Falls are ac be depended upon. A rate below 12 per 1,000 in a city of sm unusual as to attract attention to the methods of reporting rate of 8.6 is an indication that some deaths in Little Falls were in that year. If the methods of registration are not accurate an are not taken to insure complete reporting, then that error is lil in every year and all the rates would be too small. If such a c exist and it is hard to understand and explain the low rate in 19 the apparent healthfulness of the city as measured by the deatl justified and not only is the upward tendency of the curve in to be deprecated but also the high rates during the entire period.

Table 2 shows the number of deaths from the different diseas increase or decrease between the years 1900 and 1902. It is in notice how the large saving of life, 73 persons, was brought a will be seen by following across the line marked decrease that t deaths less from typhoid fever, 3 less from croup and diphtheri the other diseases as shown in the table. Perhaps one-half are c ascribed to preventable diseases whose recurrence did not happ place in 1902, but, under proper sanitary conditions, there is no their return should be allowed nor why in 1907 their number s increased so as to quite equal the number in 1900.

In respect to typhoid fever, Little Falls has a most unenvia Table 3 shows the number of deaths from typhoid fever in Little 1890 together with the death rates per 100,000 population, and Fi this rate together with the corresponding rates for typhoid fe

Figure No. 1

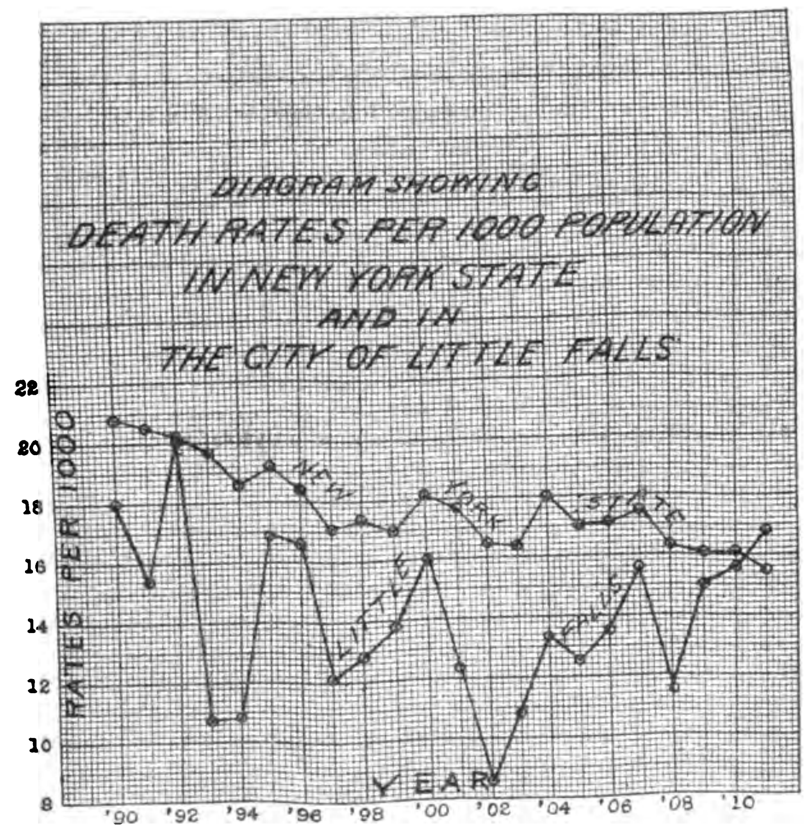
DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF LITTLE FALLS
RATES PER 1000
22
20
18
16
14
12
10
8
NEW YORK STATE
LITTLE FALLS
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

State throughout the same period. As with the general death rate the characteristic of the rate for the State is its downward tendency, particularly since 1891. In that year the State rate was 30.5 and since that time it has decreased until in 1911 it was 14, the lowest rate ever found in the State. By comparison the curve for Little Falls is so uneven as to make any tendency impossible to discover. In 1900 and in 1895 the rates were more than 125 per 100,000, rates which indicate a prevailing epidemic. The average for the 22-year period is 40.4, which is at least three times a reasonable rate and four or five times rates actually in cities where sanitation is properly considered.

TABLE 2

Showing Deaths from Specific Diseases in Little Falls for the Years 1900 *and* 1902 *with Increase or Decrease*

	Total	Cerebro-spinal menin-gitis	Typhoid fever	Malaria	Erysip-elas	Whoop-ing cough	Croup and diph-theria
1900	162	1	13	....	....	1	7
1902	89	....	4	1	2	....	4
Decrease	73	1	9	....	....	1	3
Increase	....	....	....	1	2	....	....

	Diarrhea	Acute respiratory diseases	Consump-tion	Puerperal diseases	Other digestive diseases	Urinary diseases
1900	7	19	18	2	12	10
1902	3	8	5	....	•8	7
Decrease	4	11	13	2	4	3
Increase	....	....	....	....	....	....

	Circu-latory diseases	Nervous diseases	Cancer	Accidents and violence	Old age	Unclassi-fied
1900	14	14	6	11	14	13
1902	7	13	2	12	6	7
Decrease	7	1	4	....	8	6
Increase	....	....	....	1	....	....

It is interesting to observe that in 1895, when typhoid fever was epidemic, the total death rate in the city was also high, although the twelve deaths from typhoid fever are not sufficient to account for the excess of deaths from all causes in that year. Similarly, in 1900 the typhoid rate was high and the general death rate high, but in 1907, when the general death rate was high and almost equal to that of the other years mentioned, the typhoid rate was as low as in any year of the entire period. Apparently, then, the number of typhoid fever cases and deaths affects the general health of a community but there are other forces involved besides those connected with this one disease.

TABLE 3

Showing the Population, the Number of Deaths
Death Rate per 100,000 Population in the
Years 1890 to 1911 Inclusive

YEAR	Popu
1890	8
1891	8
1892	8,
1893	9,
1894	9,
1895	9,
1896	9,
1897	9,8
1898	10,0
1899	10,1
1900	10,3
1901	10,52
1902	10,67
1903	10,82
1904	10,97
1905	11,122
1906	11,352
1907	11,582
1908	11,812
1909	12,042
1910	12,273
1911	12,579
Average	

For comparison with the ratio at Little Falls the ra
given in Table 4, are quoted from a paper read before
Supply Association March 5, 1912, by Dr. A. J. McLou
States Marine Hospital Service. In this table it will
death rates of the cities given are all below 5 per 100
is maintained year after year without variation, so that
not mere accidents or coincidents. The cities represent a
13,000,000 persons, among whom the average typhoid deat
population is only 3.4. The 50 registration cities in the U
population is over 100,000 inhabitants each, with an agg
of not more than 20,000,000, have in 1910 a rate of 35 pe
deaths, and at least 200 cases of typhoid fever per 10
which should never have occurred. It must therefore be
long as Little Falls has more than one death per year fro
it is suffering from an unnecessary scourge, the one deat
accompanied with from 10 to 15 cases. If the number of
to 2, so that the city has from 29 to 30 cases, the condition
should call for immediate and searching examination on the p
authorities. In 1906 there were 6 deaths with probably 60
parently some awakening of uneasiness on the part of the ci
In 1900 there were 13 deaths with probably 150 cases, a mos
dition and one sadly reflecting on the character of the city v
such disgrace. In a small city the tabulation of statistics and
to be drawn therefrom are not as conclusive as in larger citi
addition or subtraction of a single death materially changes th
which may be drawn from the statistics, but in Little Falls th
seems unmistakable.

TABLE 4

Showing Annual Death Rates from Typhoid Fever per 100,000 Population in 10 European Cities

	Average for ten years, 1901–1910	Average for five years, 1901–1905	1906	1907	1908	1909	1910
Stockholm	1.7	3	2	2	1	5.0	1.8
Christiania	2.4	3	4	2	2	1.7	1.6
Munich	2.5	4	2	3	3	1.9	1.4
Edinburgh	2.9	7	3	3	2	1.2	0.3
Vienna	3.7	4	5	3	4	3.8	3.8
Hamburg	3.7	4	4	3	4	3.3	4.1
Berlin	3.8	4	4	4	4	4.2	3.9
Dresden	4.2	4	7	2	6	4.2	3.2
Copenhagen	4.5	8	4	2	7	3.7	3.6
London	4.7	8	6	4	5	2.2	3.3

The cause of typhoid fever has chiefly been found to be either polluted water or infected milk. Of late years, much stress has been laid on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible, without further investigation, to say to which of these causes the large number of cases in Little Falls has been due. It must be left to the local health authorities to so examine the local conditions, the sanitary surroundings of the residences, the character of the milk distributed and the quality of the water supply, as to be sure that they have taken every precaution to prevent a further recurrence of this disease. Turning to deaths of children under five years (see Table 5), the same variation and lack of downward tendency is to be noted. Under normal conditions the death rate of children under five years is about 50 per

TABLE 5

Showing the Population, the Number of Deaths under Five Years and the Death Rates per 10,000 Population in Little Falls for the Years 1890 to 1911 Inclusive

YEAR	Population	Number of deaths under 5 years	Death rate per 10,000 population
1890	8,500	33	38.8
1891	8,688	22	25.3
1892	8,876	40	45.1
1893	9,064	21	23.2
1894	9,252	18	19.5
1895	9,440	23	24.4
1896	9,628	41	42.6
1897	9,816	13	13.2
1898	10,004	23	23.0
1899	10,192	22	21.6
1900	10,381	30	28.9
1901	10,529	26	24.7
1902	10,677	15	14.5
1903	10,827	18	16.6
1904	10,973	14	12.8
1905	11,122	21	18.8
1906	11,352	35	30.8
1907	11,582	34	20.4
1908	11,812	26	22.0
1909	12,042	48	39.9
1910	12,273	39	31.8
1911	12,579	59	46.9
Average			27.0

10,000 population, as shown by statistics of the United S New York State and of Massachusetts. Such a rate, reached in no year during the twenty-two year period, al in 1896 it was nearly reached. A great variation in the creasing from that of the years mentioned to the minimu The birth rate in Little Falls for the first half of the de was 14.8, about seven lower than the average of the State. of the decade, the figure was 20.1, an increase of about five the normal for the State period. In 1911, the birth rate 28.4, the average city rate being 24.3. In ten years, the compared with that of the State as a whole, has increas than the normal, to four more. Probably no more potent fa rate could be found than this fact. Inasmuch as about 30 deaths in a community occur among young children, and i are particularly susceptible and respond promptly to impu of all sorts, a high birth rate and a large number of child munity are usually accompanied by a high rate, simply beca many children to die.

It is not proposed as a measure of reducing the death rate ence the number of children in Little Falls but rather to im which, through their impurities, undoubtedly cause an exces this class. The actual significance of the rates shown in Tal ascertained without a correction based upon the number of ch edly living in the city compared with the normal proportion various ages. Since the birth rate up to 1911 has been co than the average for the State, it is only a fair and reasona that the number of children in Little Falls is less than the ave since there are fewer children there to die, the fact that the dea children is small is of no special significance. The variabilit however, is an indication of impure water, or milk, or both, or care of children in their homes, and calls for remedial measure by the sanitary authorities. Because of the relatively large manufacturing done in Little Falls, the large number of women c the results of such employment on the home life, it is possible th ence of the factories on the death rate of children is worth cons that in Little Falls, as in other cities where attention has been matter, deaths of children can be largely prevented by strict enf existing factory legislation or by the enactment of new legislation working hours and the employment of women and children, if such is found necessary.

The inference to be drawn, then, from the statistical studies have made, is that the tendency shown by the values of the dea consecutive years is alarming, since it fails to indicate any resp increasing efforts of the board of health and seems to indicate a these ordinary precautions which are becoming so generally adopte out the State as a whole. So far as could be learned, the city has tions of drainage or of living which would account either for the itself or for the tendency to increase which has been noted as cha in the past few years. The typhoid fever rate has not been so ex to suggest that the excess rate from general diseases has been water supply, since a polluted water is generally shown by the typh rate, rather than by the general death rate. It would seem, how there must be present in Little Falls conditions which have interf are still interfering with the downward tendency of mortality rates through the State as a whole and that there are present also in the ditions which cause unaccountable and sporadic variations in all th It is manifestly the duty of the health authorities to determine the these variations and to take such steps as shall bring them under co

Water Supply

The waterworks of Little Falls date from the year 1885 when a s pounding reservoir containing about a million gallons was built on creek, eight miles from the city in a direct line. The flow of the st sufficient to furnish in general about 3,000,000 gallons, so that the

of the city which is about that amount has been, in general, provided for. About the same time the distribution reservoir was built three-fourths of a mile north of the city at an elevation of 300 feet above the highest point of the city, the capacity of the reservoir being 25,000,000 gallons.

In 1897, the supply being occasionally low, two reservoirs were built on the upper end of a branch of Spruce creek. The further one, known as the Klondike reservoir, is at an elevation of about 1,250 feet above the city, has an area of 126 acres, is twenty-five feet deep on the average, and has a capacity of 700,000,000 gallons. The water of this reservoir discharges into the stream, which it follows for about a mile and a half. There it meets the water from the second Spruce creek reservoir, known as Eaton pond. This has an area of about eight acres, is from two to fifteen feet deep and impounds 140,000,000 gallons. From the outlet of Eaton pond a 20-inch pipe line leads down and connects with the Beaver creek reservoir, from which point the combined waters flow to the city in a pipe line whose diameter varies from twelve to twenty inches, depending on the grades of the particular part of the line.

At the time the Eaton pond reservoir was built, the engineer, Mr. S. E. Babcock, constructed a slow sand filter which is arranged to receive the waters from both the Klondike reservoir and the Eaton pond. This is a slow sand filter underdrained by the patent Babcock siphon tiles, laid in parallel lines eight feet apart. According to the results of inspections made in recent years, the filter bed has been allowed to deteriorate, the water finds its way directly to the underdrains so that there is no apparent necessity of scraping or cleaning the beds and the apparatus for indicating loss of head, although provided, has never been practically put into use. In 1908, during a period of drought, the filter was utilized as a matter of protection to the quality of the water for about fifteen days. No improvement in the appearance of the water resulted from the filtration, according to current report.

Twelve hundred feet above the distributing reservoir is a so-called aerating canal which receives the water from the lower end of the pipe line. This canal is two feet wide at the bottom, paved on the bottom and sides with quarry stone and riprap, the side slopes being topped with earth embankments.

Near the Beaver creek reservoir are two large springs known as the King springs. These rise from the ground and the waters are caught in two circular basins and conveyed by a branch 6-inch pipe to the main pipe line. It is now proposed by the city authorities to develop other springs, if possible, and to entirely eliminate the Spruce creek water and also Beaver creek water as far as possible, the creek waters being considered inferior in quality and their high color being objected to. The soil in the vicinity is glacial drift overlying limestone and contains apparently large amounts of good water. Most of the Spruce creek watershed is wooded and exceedingly swampy and the bed of the stream falling very slowly, forms long, shallow reservoirs which may be the source of the springs.

The watersheds of both Spruce and Beaver creeks are sparsely inhabited, but around the shores of the Spruce creek ponds are many cottages and camps, attracted by the wild and wooded character of the country. Beaver creek itself is a narrow stream falling quite rapidly, but uniformly, through a wide strip of wooded land far from any houses or barns, except on the extreme outer edge where one branch comes near a main traveled east and west road. Here are some dozen farmhouses. During the course of an inspection made in the fall of 1910, the inspector reported that one branch of Beaver creek flowed through pasture land where cows were in the habit of feeding, or wading in the streams, and where the banks of the streams were plainly sprinkled with cow manure. Boating and fishing are allowed on the upper reservoirs but bathing is distinctly prohibited, except at points two miles upstream from each of the three reservoirs. The two reservoirs on Spruce creek are not generally in use but are held for emergencies and it is now the expectation of those in charge that, with the development of more springs, they will never again be needed.

A coke filter is built at the outlet end of the distributing reservoir which is supposed to purify the water supplied to the city at such times as purification is needed. This filter is contained in a masonry well twelve by twenty-five feet and eight feet deep. About 1,700 bushels of porous coke

are used to fill this well. Upward
upward through the coke which is
into the clear water well from whicl
is cleaned by allowing the water fr
escape through a mud pipe at the bo
ticed once a week except that it can
ervoir stands at a lower level than t
is so coarse and the rate so high tha
accomplishes no purification whatev
are protected by rules and regulatio
ment of Health.

Table 6 shows analyses of the city
atory during 1910 and 1911. It will
ity of the water is extremely variab
parts per million up to .018 parts p
from .02 to .112. The chlorine also
The relatively large amount of albur
in all samples and the high nitrates
erable quantity, as might, indeed, be
shed. The bacterial count is, howeve
analyses. On July 12, 1910, there we
August 29 of the same year, 19,000.
low, even for surface water, and th
plainly indicated. Further than this

TA

Report of Water Analyses

Collected on	1/5/10	4/5/10
Color	5	....
Turbidity	Clear	....
Odor, cold	1 veg.	....
Odor, hot	2 veg.	....
Total solids	134.	....
Loss on ignition	18.	....
Mineral residue	116.	....
Nitrogen as:		
Free ammonia	.008	....
Albuminoid ammonia	.024	....
Nitrites	.001	....
Nitrates	0.30	....
Oxygen consumed	1.4	....
Chlorine	0.75	....
Total hardness	103.	....
Alkalinity	93.5	....
Bacteria per c.c.	350.	450.
B. coli type:		
10 c.c.	Absent	Present
1 c.c.	Absent	Absent
1/10 c.c.	Absent	Absent

Collected on	2/17/11	4/25/11
Color	10	....
Turbidity	5	....
Odor, cold	1 veg.	....
Odor, hot	2 veg.	....
Total solids	141.	....
Loss on ignition	37.	....
Mineral residue	104.	....
Nitrogen as:		
Free ammonia	.014	....
Albuminoid ammonia	.020	....
Nitrites	.003	....
Nitrates	0.20	....
Oxygen consumed	1.50	....
Chlorine	1.25	....
Total hardness	103.	....
Alkalinity	103.	....
Bacteria per c.c.	425.	350.
B. coli type		
10 c.c.	Present	Present
1 c.c.	Absent	Absent
1/10 c.c.	Absent	Absent

their presence in a decided majority of the samples taken. These samples, however, do not distinguish between the three sources of supply, that is, between the Spruce creek water, Beaver creek water and the King springs. The latter are apparently well protected from surface pollution and it is probable that they furnish better water than the other supplies. It may be noted, however, that a cesspool exists only fifty-five feet distant from a shallow basin which receives the overflow from the springs and which is made a part of the city water supply. The slope of the ground is from the basin to the cesspool but the direction of the underground flow is not known.

Conclusions

1. The general death rate of Little Falls has been lower than that of the State up to 1911, when for the first time it exceeded that rate. There is plainly an upward tendency, however, of the city rate, which, if continued, should cause grave apprehension.

2. The fact that in 1902 the rate was only 8.6 gives rise to the question whether the deaths are accurately reported and whether the apparent low rate is a correct representation of the deaths occurring in the city.

3. The typhoid fever death rate has been extremely variable, with high rates in 1895 and 1900 which amounted approximately to epidemics. The average rate is three times a normal one and, although in 1910 only one death occurred, in 1911 three are recorded, which is excessive. The general death rate shows excessive rates in the same years with typhoid fever, indicating conditions which affect the health of the community in other ways than by the particular infection causing that fever. The suspicion is therefore aroused that the water supply is largely responsible for both the general unhealthfulness and the typhoid epidemics.

4. The water supply comes from surface streams and from springs, the streams being subject to a small amount of surface contamination. The watershed is sparsely inhabited but summer camps and cottages exist close to the water's edge. The filters which have been built are not efficient as a protection against contamination.

5. The chemical and bacterial analyses justify the suspicions which the inspection of the watersheds would arouse. The chemical analyses indicate an excess of vegetable matter and the bacterial analyses show fecal pollution. The bacterial count is high and bacteria of the B. coli type are usually present.

Recommendations

1. In view of the irregular death rate and its upward tendency of late years, it is recommended that careful studies be made by the local health authorities of the vital statistics of the city with a view to ascertaining, if possible, the particular disease or diseases most prevalent and in excess of the normal and that steps be taken to reduce the number of deaths from such diseases by the introduction of proper sanitary precautions.

2. In view of the analyses which show high bacterial counts and the prevailing presence of fecal organisms, it is recommended that special studies be made of the possibility of improving the present water supply; that the present coke filter be abolished and that a modern, efficient filter be installed in the vicinity of the distributing reservoir.

Respectfully submitted,

HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the other city authorities urging that steps be taken to carry out the recommendations contained in the report.

NORTH TONAV

Mr. Theodore Horton, *Chief Engineer, Sta*
N. Y.:

Dear Sir: — I have the honor to hand you
condition of the city of North Tonawanda
quality of the water supply. The visit to
report is based was made in August, 1911,
been made and the report written durin

North Tonawanda is located on the nort
half way between Buffalo and Niagara F
side by the Tonawanda creek, here used by
The New York Central and Hudson River
tracks passing through North Tonawand
has trackage rights through the city. T
of the New York Central connect at Nort
lines pass through the city.

The city was originally settled in 1809
incorporated as a separate village in 1865
as it was practically at the terminus of
with Tonawanda originally an important
many years was a large shipping post
lumber yards there were of nearly the s
at the other end of the canal. Since, l
ried by the canal has decreased, the sup
fallen away, and since the reduction in
of the city has declined. In 1900 the p
and in 1910, 11,955 — an increase of nea
in large part, to the amount of manufa
Tonawanda on account of the proximit
1900, although in population the city
of the State, it had a rank of twe
products. It is probable that this hig
terests has continued since 1900, and t
will show an even greater rank, based o
discrepancy between that rank and tha

The topography of the city is charact
plane, but little above the level of the
tion is determined partly by the popul
interests. There are evidences of a l
and some of the districts of the city
living which may in part, through th
the high death rates, particularly am

Vital S

The average general death rate in N
is 15.2 — a rate which is apparentl
responding rates for the State. Thu
16.1, and in 1911, 13.6, both higher t
although the death rates in the State
at any other time for which the r
10-year period 1900 to 1910 the av
for the 10-year period preceding, 16.
rate of North Tonawanda. But the
and city population and for comparis
haps, more properly take the death r
rate of the cities of New York Stat
was 17.8, which, again, is higher tha
It would therefore seem to be justif

determined by the general death rates, the sanitary condition of North Tonawanda compares favorably with that of the State and with that of other cities of the State. But a more detailed study of the figures suggests other less favorable conclusions.

Table 1 gives the population, the number of deaths and the death rates per 1,000 population in North Tonawanda for the period 1892 to 1911 and Figure 1 shows the rates plotted graphically with similar rates for the State as a whole for comparison. Two characteristics are to be noted: First, that the curve for the State has a gradually declining tendency, the rates for the last four years being plainly lower than the rates in the middle portion of the curve, which are in turn markedly less than those at the beginning of the period. It is assumed by those interested in the health conditions of the State that this reduction in the general death rate is due to the increased care exercised by the health authorities and by the greater intelligence shown by individuals generally. In the curve for North Tonawanda the death rates in the last three years are lower than those at the beginning of the period but are higher than those in the middle of the period, so that, while the decline from the beginning to the end of the period is even more marked than that for the State, it is not a gradually declining rate and does not equally indicate obedience to some definite controlling factor.

Then again, while the decrease from 1892 to 1903 is most emphatic, since 1903 the rate has increased so that if the decline in the first part of the period shown was due to forces set in motion by sanitary authorities, those forces have ceased to operate and have been supplemented by other forces which are causing a greater amount of sickness and death.

TABLE 1

Showing the Population, the Number of Deaths Annually and the Death Rate per 1,000 *in the City of North Tonawanda for the Years* 1892 *to* 1911 *Inclusive*

YEAR	Population	Number of deaths	Death rate per 1,000 population
1892	4,800	126	26.3
1893	5,333	137	25.9
1894	5,866	107	18.2
1895	6,399	144	22.5
1896	6,933	124	17.9
1897	7,467	127	17.0
1898	8,001	102	12.7
1899	8,535	98	11.5
1900	9,069	103	11.4
1901	9,286	102	11.0
1902	9,503	114	12.0
1903	9,721	106	10.9
1904	9,939	128	12.9
1905	10,157	145	14.3
1906	10,516	139	13.2
1907	10,875	137	12.6
1908	11,235	152	13.5
1909	11,595	162	14.0
1910	11,955	160	13.4
1911	12,315	156	12.7
Average			15.2

The other feature clearly brought out by Figure 1 is the fact that the death rates in North Tonawanda since 1898 have been lower than that of the State as a whole. In 1901 the city rate was 11, and in 1903, 10.9, about 7 deaths per 1,000 less than in the whole State. There did not appear to the inspector any peculiar conditions of climate or housing or food supplies or labor conditions to explain why the population in North Tonawanda should show such a marked decrease in death rate and the very fact that since 1903, under the repeated admonitions of the State Department of

Health, the death rate has increased, suggests that the apparent rate when the conditions seemed so favorable to the city was largely a matter of imperfect and inaccurate registration. Professor Willcox, statistical expert for the United States Census Bureau, declares that whenever in any city the death rate goes below 12 the accuracy of the statistics must be questioned. He quotes Dr. Billings, referring to the death rate in Buffalo, on this point as follows: "The probabilities are at least 50 to 1 that the death rate has not been below 16 per 1,000 per annum."

Mr. Willcox himself says, referring to the death rate of 13 per 1,000 in Ithaca: "To one knowing nothing about vital statistics this death rate, which was one of the lowest in the State, proved that Ithaca was a remarkably healthy town, but to one having any knowledge of the subject and of the probabilities in the case, this figure was so low as to be incredible and to put one on inquiry as to its accuracy. Investigation showed that in about half the cases of death in Ithaca the law (requiring registration) was violated and that in about one-quarter of them no record of the deaths was ever made or reported to Albany." The true death rate of Ithaca was shown to be not below 16.6 per 1,000 instead of the 13.4 which was claimed. In the light of such criticism of the two such authorities death rates in North Tonawanda of 10.9, 11 and 11.5 must at least suggest the possibility of inadequate registration.

So far as the inspector could note there were in North Tonawanda no natural conditions so superior to those existing in other parts of the State as to suggest healthful conditions so manifest. The older portion of the city near the river is crowded together and somewhat congested. There is a large proportion of population of the working class whose knowledge of sanitation must be assumed to be of low order and it is hard to believe that under such conditions a low death rate can be steadily maintained year after year.

If the rates could be imagined corrected and thereby increased to correspond in these latter years with the rates of the State, the health conditions in North Tonawanda in the early years of the period shown in Figure 1 must have been something alarming, since increasing the rate for 1893 by 7 would indicate a death rate of some 33 or 34 per 1,000 — a most lamentable condition of public health. It is, however, more easily to be believed that such high rates could have prevailed then than that rates of 10.9 and 11 could have been reached later.

With respect to typhoid fever, the city of North Tonawanda is to-day among those cities of the State noted for their high rates. Table 2 shows the population of the city, the deaths from typhoid fever and the death rates per 100,000 population for the past twenty years and Figure 2 shows these rates plotted, together with similar rates for New York State. It is necessary only to glance casually at the diagram to show that for the first six years of the period the rate was one long protracted epidemic and that since 1906 the beginning of another protracted period may be discerned. Between 1898 and 1906 the rates are comparatively moderate, particularly in 1900, 1902 and 1906. In those years the rate was such as is to-day considered a reasonable rate for a city properly governed and supplied with sanitary food and other conditions of living.

It has been found by experience and statistics that it is quite possible, in cities where proper supervision is exercised over the quality of the water and milk supplies in the northern part of the United States, to maintain a typhoid fever death rate below 20, and it is not unreasonable to expect that rate to be reduced one-half as sanitary progress gains further headway. The average rate then for North Tonawanda is at least four times what it should be and if the city is to have any reputation for healthfulness it must ascertain the cause of the unusual number of typhoid deaths and take steps to remove the conditions responsible for them. Considering the number of deaths and the size of the city two deaths from typhoid fever should be a maximum number and any number of deaths greater than this should be cause for alarm and for great activity on the part of the local board of

Figure No. 1

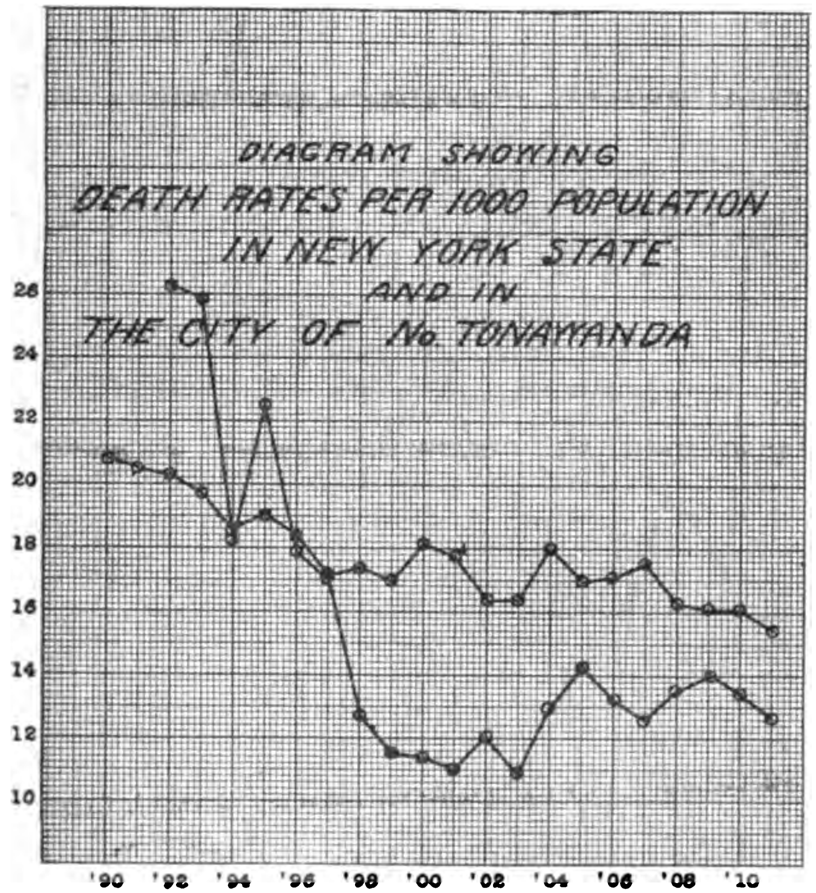
DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF No. TONAWANDA
26
24
22
20
18
16
14
12
10
'90 '92 '94 '96 '98 '00 '02 '04 '06 '08 '10

Health, the death rate has increased, suggest
the conditions seemed so favorable to the cit
perfect and inaccurate registration. Professo:
the United States Census Bureau, declares
death rate goes below 12 the accuracy of th
He quotes Dr. Billings, referring to the deat
as follows: "The probabilities are at leas
has not been below 16 per 1,000 per annum."

Mr. Willcox himself says, referring to th
Ithaca: "To one knowing nothing about
which was one of the lowest in the State, p
ably healthy town, but to one having any l
the probabilities in the case, this figure wa
to put one on inquiry as to its accuracy
about half the cases of death in Ithaca the
violated and that in about one-quarter of t
ever made or reported to Albany." The tru
to be not below 16.6 per 1,000 instead of
the light of such criticism of the two such
Tonawanda of 10.9, 11 and 11.5 must at
inadequate registration.

So far as the inspector could note the
natural conditions so superior to those ex
as to suggest healthful conditions so ma
city near the river is crowded together a
a large proportion of population of the
sanitation must be assumed to be of low o
under such conditions a low death rate ca
year.

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and milk supplies in the northern pa
a typhoid fever death rate below 20.
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The average rate then for North Tona
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steps to remove the conditions respon
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Figure No. 1

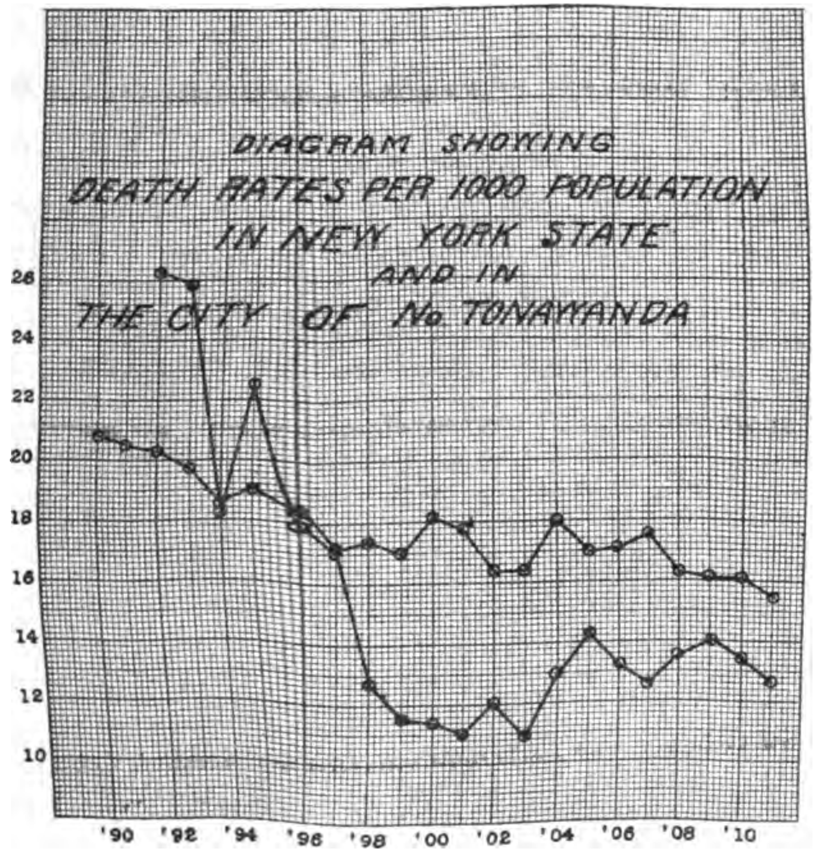
DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF No. TONAWANDA
26
24
22
20
18
16
14
12
10
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

health. In 1911 there were 12 deaths, 10 more than a city of the size of North Tonawanda should have, and in the 20-year period there have been 15 years when more than 2 deaths have been recorded.

TABLE 2

Showing the Population, the Number of Deaths from Typhoid Fever and the Death Rate per 100,000 *Population in the City of North Tonawanda for the Years* 1892 *to* 1911 *Inclusive*

YEAR	Population	Number of deaths from typhoid fever	Death rate per 100,000 population
1892	4,800	8	166.7
1893	5,333	8	150.0
1894	5,866	5	85.2
1895	6,399	10	156.3
1896	6,933	10	144.2
1897	7,467	8	107.1
1898	8,001	2	25.0
1899	8,535	2	23.4
1900	9,069	1	11.0
1901	9,286	3	32.3
1902	9,503	1	10.5
1903	9,721	4	41.1
1904	9,939	3	30.2
1905	10,157	4	39.4
1906	10,516	2	19.0
1907	10,875	5	46.0
1908	11,235	6	53.4
1909	11,595	6	51.7
1910	11,955	5	41.8
1911	12,315	12	98.3
Average			66.6

Since 1 death is generally accompanied by about 10 cases of illness not fatal, it seems that if by a proper institution of health measures the number of deaths from typhoid fever had been held down to 2 each year, then in the last 20 years 68 deaths and about 700 cases of illness from typhoid fever would have been prevented. If the usual value of human life is taken at $5,000, according to the evidence of statistical experts, then the direct loss to the city from those 68 deaths has been $340,000, and considering the loss from the accompanying cases of illness the total to the city must have been not far from three-quarters of a million dollars. From the money standpoint alone there is good reason for believing that it would be worth while for the city of North Tonawanda to take some cognizance of the presence of typhoid fever in the city, for its health board to indicate its interest in the problem, for the city officials to provide the necessary funds for studying the problem and for the residents as a whole to demand that such a study be made. In 1908 and 1909 there were 6 deaths from typhoid fever; in 1911, 12 deaths, the number increasing from year to year apparently without interference by the local health authorities. Before the record for 1912 is finished and before the usual fall outbreak occurs the onset should be headed off if possible.

In a small city the tabulation of statistics and the inference to be drawn therefrom are not as conclusive as in larger cities since the addition or subtraction of a single death may change materially the conclusion which may be drawn from the statistics. But in the case of North Tonawanda the repetition of three or four deaths from this disease each year would seem to show that it is not accidental but that the high rate is due to local conditions which should be investigated. In the State as a whole the efforts of the sanitary authorities and the greater appreciation of sanitary truths is shown by the gradual reduction in the typhoid fever death rate. In 1891 this rate was 30.3 and in 1911 it was 13.9 — a reduction of more than one-half, which

has been accomplished gradually year by yea
Figure 2 shows this marked downward tenden
ever, there is no such tendency and the inc
since 1902 is an indication that the forces a
prevalence of this disease are not yet brough

The cause of typhoid fever has generally t
water or infected milk. Recently, also, muc
larly in southern States, on the possible tra
from infected material in drains or privies
possible without further investigation to se
occasionally large number of deaths and pre
cases of typhoid fever in North Tonawand
left to the local authorities to so examine
surroundings of the residences, the characte
quality of the water supply as to be sure
caution to prevent a further recurrence of a
and if possible to reduce the amount now

The use of well water in a community
time the receptacle of human wastes is an
and the fact that polluted river water is
factories suggests the possibility of such r
lessly used in such a way as to afford e
the human system. It is possible, also,
sprinkler system of the factories using riv
on the one side and the city mains on th
found that where such conditions as the
the city water pipes are not tight, so t
over and the pressure raised in the spri
mains, some of the river water passes i
of disease.

Turning to the deaths of children un
that while the average death rate at t
wide variation from that average in t
the rates were unusually high, corresp
fever, but during the period of low t
though lower, did not drop proportio
creased as fast or faster than typhoid

TAB

Showing the Population, the Number o and the Death Rate per 10,000 I wanda, for the Years 1892 to 1

YEAR
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
Average

States and also in Massachusetts and in New York State is not far from fifty per 10,000. Therefore, North Tonawanda, with a rate of 62.2, is above the normal and indicates plainly most deplorable conditions, either of housing or of food and water supply. The death rate of children is a most sensitive index of the sanitary condition of a community, although the rate, for a proper interpretation, should be based, not upon the population, but upon the number of children living under five years old, since manifestly, if the adult proportion of the population is greater than the normal, the death rate of children under five would be low in comparison, merely because of the small number of children among the total population. Thus, in Austria, where the birth rate is about 35, the deaths of children under five were, in a certain year, 46 per cent. of all the deaths, while in France, where the birth rate is 21, the deaths of children were only 23 per cent. In North Tonawanda, in 1910, the birth rate was 27.7, and in 1911 it was 32.6 — an average excess over the other cities of the State of 5.3 per 1,000, or about fifty children per year. There are, then, in North Tonawanda, abnormal conditions, insofar as the birth rate is concerned, conditions leading to a larger number of children in that city than is likely to be found in the average city of the State. Any conclusion, therefore, drawn from the death rate of children must take into account the larger proportion of children in North Tonawanda and the fact that this death rate is above the normal may be only the natural result of a large proportion of children among the total population.

That there is, however, an excess of deaths of children is shown in another way by the percentage of deaths under five to total deaths. In the last six years in New York State this ratio has ranged between 27.3 and 27.9, that is, a little more than one-fourth of all the deaths were under five years old. Table 4 shows the total number of deaths, the number of deaths under five, and the percentage of the latter to the former in North Tonawanda for the last six years. This shows an average ratio for these six years of 42.1, or 14.5 higher than that for the State. This cannot be accounted for altogether by the larger number of children in the community, since this excess is more than 50 per cent., while the excess in the birth rate is less than half that amount. If the greater number of children and the greater percentage of deaths among children increase or diminish equally, it is a fair assumption that the greater number of deaths is accounted for entirely by the number of children, but where the death rate increases faster than the number of children, and where, as in North Tonawanda, the number of deaths of children is much greater than in the State as a whole and out of proportion to the excess of children in the community, the only conclusion is that there are conditions of crowding or poor food in the city, which result in this high death rate.

TABLE 4

Showing the Total Number of Deaths, the Number of Deaths under Five, and the Percentage of the Latter to the Former in North Tonawanda for the Years 1906 *to* 1911 *Inclusive*

YEAR	Total deaths	Deaths under five	Percentage
1906	139	56	40.3
1907	137	54	39.4
1908	132	55	36.2
1909	162	76	46.9
1910	160	85	53.1
1911	136	57	36.5

One of the greatest causal factors in infant mortality is that group of disorders classified as diarrhea and enteritis. In the registration area of the United States in 1910, 28 per cent. of the children under one year are recorded as having died of these diseases. About 85 per cent. of all the deaths in this group occur in children under two years of age and it is generally conceded that certain etiological factors not bacterial in nature are largely responsible for the prevalence of these infant diseases. Thus, the influence

of climate upon enteritis is acknowledg understood to be a summer disease. The population and of certain classes of immi also. But perhaps the most important i is the well known influence of the slums of woman labor in mill and factory town and water impurities, and if one could and milk, we should have in the death index of any city's sanitary condition. to have slums, and which, in spite of a itis rate, has, in all probability, insanit tially different from the slums of the lar infant mortality.

Table 5 shows the death rate from North Tonawanda for the past five years

TABLE

Showing the Population, the Number Years, and the Death Rate per

YEAR
1907
1908
1909
1910
1911

For comparison, the following table Public Health and Marine Hospital Se gives the death rates from typhoid fe cities with notes as to the water sup list, Pontiac, Ann Arbor and Manistee low rates from both typhoid fever a and Jackson are marked as having p rates would indicate either a questio sanitary conditions.

TA

Showing the Average Death Rates p Enteritis in Michigan Cities, wi 1910

CITIES
Escanaba
Sault Ste. Marie
Alpena
Ironwood
Port Huron
Flint
Traverse City
Bay City
Lansing
Battle Creek
Kalamazoo
Jackson
Muskegon
Saginaw
Pontiac
Ann Arbor
Manistee

In New York State, in 1910, the death rate in the rural communities from enteritis was 59.3 and in the urban communities 111.9. Just what may properly be considered a normal and reasonable death rate from enteritis has not been fixed, but from the death rate in rural communities and from the rates shown in Table 6, in the Michigan cities, where the water supply is good, there would seem to be no reason why the death rate from diarrheal diseases should be greater than 60 per 100,000. One may further claim that where the death rate from these diseases does exceed 60, the indications are that either the water supply is polluted or that there are conditions of living which militate against the health of childhood.

Unfortunately, time did not permit the inspector to remain in North Tonawanda long enough to follow up the indications here made and to determine the actual cause of the high rates here given. It will be necessary for the local authorities to consider, by locality, each infant death and to determine, if possible, the cause of such death. Thus, by studying conditions as they existed, in 1910, when 21 children are reported to have died from diarrhea and enteritis, it may be possible to determine the causal factors and then to take such steps as shall prevent any further increase in the deaths of children, so significant in the estimation of the sanitary condition of a city.

So far as could be learned, the city has no conditions of drainage which will, by superficial examination, account either for the epidemics of typhoid fever or for the excess of deaths of children. As already noted, there are suggestions of congestion, tenement house living and crowded districts which may play some part in bringing about unhealthy conditions of living, but there must be present, in North Tonawanda, other conditions which have interfered and are still interfering with the lowering of death rates from preventable diseases, this tendency to reduced death rates being inevitably present in the State as a whole. It would also seem that there must be present in the city, not under full control by the sanitary authorities, conditions which cause marked periodic and excessive outbreaks of typhoid fever as well as from diarrhea and enteritis. It is manifestly the duty of the health authorities to determine the cause of these outbreaks and excesses and to take such steps as shall bring them under control.

Water Supply

The water supply of North Tonawanda was installed by a private company in 1886, the city, however, having since purchased the plant, in 1894. The source of the supply is the Niagara river, the outlet of Lake Erie and the receptacle for Buffalo sewage, amounting to about 150,000,000 gallons per day. The system is that of direct pressure and the amount supplied is about 10,000,000 gallons per day. It is reported that there are forty-six miles of distribution pipes. The intake extends into the river well towards the west side where it is believed danger from pollution is much less than further east. Tests made at other parts of the river indicate that the sewage of Buffalo, after discharge into the river, follows the eastern shore and does not extend into the thread or main portion of the current. On the other hand, the quality of the Buffalo drinking water which comes from the main thread of the Niagara river does not show by analysis that the river, even above the city of Buffalo, is free from pollution and the analyses of the North Tonawanda water, to be referred to later, indicate that at times the pollution is so great as to suggest that the popular belief in the purity of the water is misplaced and that at times such purity is interfered with by Buffalo sewage. The typhoid fever statistics, already referred to, showing continuous epidemics year after year, point plainly to a polluted condition of the public water supply. Why the rates in 1900 and 1902 should be so low with the continued use of the same water supply is not apparent but the records since 1906 show such repeated high rates as to make the pollution of the river and its unfitness for domestic use certain.

The analyses (see Table 7) confirm the impression which the natural topographic features give as to the character of the water. Thus, while the free

ammonia is generally low, the albuminoi
which, together with the constant presence
organic matter. The presence of nitrates i
also that pollution of some long standing i
teria per c. c. is always high and at times r
undiluted sewage. Bacteria of the B. coli
sent contamination by fecal organisms, is p
majority of the cases. The fact that thes
c. c. samples merely indicates the great
that in the amount of the sample (about
found by the analyst. The evidence, ther
the water supply is bad and that it is p
phoid fever death rates and also for the
deaths of children.

Conclusi

1. North Tonawanda is a small manu
the State on the Niagara river. It was
center but with the decadence of the Eri
portance. Its proximity to Niagara F
power from that city indicate a future
with by insanitary conditions.

2. The general death rate is low whe
a whole. The difference is, indeed, so g
the accuracy of the registration and rep
in some years show a rate lower than
the reason is not apparent.

TAB

Report of Water Analyses of

Source	Tap, public supply	Tap, su
Collected on	2/15/10	6
Color	Trace	.
Turbidity	10.	
Total solids	266.	28
Loss on ignition	144.	16
Mineral residue	122.	11
Nitrogen as:		
Free ammonia	.026	
Albuminoid ammonia	.092	
Nitrites	.005	
Nitrates	Trace	
Oxygen consumed	0.60	
Chlorine	6.50	
Total hardness	97.2	
Alkalinity	96.	
Bacteria per c.c.	850.	31
B. coli type:		
10 c.c.	....	
1 c.c.	Absent	
1/10 c.c.	Absent	

TABLE 7 — (*Concluded*)

Report of Water Analyses of the City of North Tonawanda — Concluded

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	12/17/10	12/28/10	2/ 2/11	4/13/11	6/ 3/11
Color	5.	....	10.	15.	10.
Turbidity	35.	....	8.	10.	10.
Total solids	256.	....	153.	146.	154.
Loss on ignition	149.	....	50.	50.	38.
Mineral residue	107.	....	103.	96.	116.
Nitrogen as:					
Free ammonia	.006	....	.006	.016	.016
Albuminoid ammonia	.104	....	.058	.074	.058
Nitrites	.002	....	.002	.002	.002
Nitrates	.04	....	.04	.10	.10
Oxygen consumed	2.60	....	2.30	1.80	2.00
Chlorine	7.50	....	7.50	7.25	7.50
Total hardness	102.2	....	100.	92.9	94.3
Alkalinity	98.	....	100.	91.	89.
Bacteria per c.c	700.	1,900.	500.	65.	49,000.
B. coli type:					
10 c.c	Present	Present	Present	Present	Present
1 c.c	Present	Present	Present	Present	Present
1/10 c.c	Absent	Absent	Present	Absent	Present

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	7/14/11	9/20/11	10/31/11	12/ 5/11
Color	5.	....	15.	10.
Turbidity	2.	....	65.	25.
Total solids	137.	....	178.	150.
Loss on ignition	19.	....	28.	29.
Mineral residue	118.	....	150.	121.
Nitrogen as:				
Free ammonia	.012	....	.020	.014
Albuminoid ammonia	.056	....	.096	.084
Nitrites	.001	....	.001	.001
Nitrates	.04	....	Trace	.06
Oxygen consumed	1.70	....	2.90	1.90
Chlorine	7.25	....	7.25	7.75
Total hardness	98.6	....	109.	111.
Alkalinity	91.	....	98.	95.
Bacteria per c.c	1,700.	450.	1,000.	1,500.
B. coli type:				
10 c.c	Present	Present	Present	Present
1 c.c	Present	Present	Present	Present
1/10 c.c	Present	Absent	Absent	Absent

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	1/23/12	3/ 7/12	4/18/12	4/19/12
Color	5.	10.	10.	10.
Turbidity	15.	5.	10.	10.
Total solids	160.	131.	141.	149.
Loss on ignition	29.	21.	11.	17.
Mineral residue	131.	110.	130.	132.
Nitrogen as:				
Free ammonia	.016	.016	.008	.004
Albuminoid ammonia	.058	.069	.032	.018
Nitrites	.002	Trace	.002	.001
Nitrates	.08	.10	.08	.06
Oxygen consumed	1.76	.08	1.1	1.4
Chlorine	7.75	7.00	6.75	7.50
Total hardness	106.	106.	104.	94.2
Alkalinity	98.	98.	92.	91.
Bacteria per c.c	125.	120.	15,000.	500.
B. coli type:				
10 c.c	Present	Present	Present	Present
1 c.c	Absent	Present	Absent	Absent
1/10-c.c	Absent	Absent	Absent	Absent

3. The death rate from typhoid fever, e is one long continued epidemic. In the la at least sixty-eight unnecessary deaths from cation that the local health authorities h their cognizance. Since 1906 the rate has rate was higher than in any year since 18

4. The death rate among young children period and has continued so high that the is higher than for the State or for the of children in North Tonawanda is presum cities but not sufficiently so to justify or rate.

5. The death rate from diarrhea and five years shows an alarming condition the rate was three times what a city with rates corroborate the indications given by

6. The water supply comes from Niaga from Buffalo, eleven miles distant. Al sewage does not extend into the river fi roundings of the intake, analyses of th indicate that at times the quality of t disease and death among the residents

Recommenc

It is recommended that the city of water commissioners take immediate ste of the city or secure a supply other tha be within the province of this report t be effected but that steps should be take ment in the quality of the water seems can be no hesitation in making this re

Re

Copies of this report were inclosed water commissioners and to the other

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OL

Mr. THEODORE HORTON, *Chief Enginee* *N. Y.:*

DEAR SIR:— I have the honor to h tary condition of the city of Olean, p the water supply. The visit to Ol made in August, 1911, and the studi report written during April, 1912.

The city of Olean lies on the no point where Olean creek enters that and a half wide and is 1,440 feet ab sides to an elevation of about 2,200 and rugged. The valley itself is al Allegheny river, with a watershed way through mountainous country between Olean and a point 30 miles miles, the greatest amount of natur in length is 3.9 feet in 850 feet at I

river above Olean for a distance of at least 30 miles can only be expressed by the word "sluggish," since it has a slope of about 15 feet to the mile. The watershed being mountainous, with deep, narrow valleys between the hills, rains of any size bring about flood conditions in the main valleys, the river channel itself being neither wide enough nor steep enough to carry off the water as fast as it is brought down. So at Olean, both in the main river and in the local creek, complaints are made of the flood conditions in the river which are, indeed, manifestly objectionable and lead to conditions of living at certain times of the year which may have an effect upon the health conditions of the city but which are inevitable from the nature of the topography.

The city is on the line of the Erie railroad and has, therefore, direct communication with Chicago on the west and with New York on the east. It is also a station on the Buffalo and Allegheny Valley division of the Pennsylvania railroad between Buffalo and Rochester on the north and Pittsburg and Harrisburg on the south. It is also a terminal of a branch line of the Pittsburg, Shawmut and Northern, which has its main line passing about ten miles to the east. Olean is also the center of an electric car system which connects it with the county seat at Little Valley and also with Bradford and Allegheny, Pennsylvania, and Salamanca and Bolivar, New York. Its location on the main line of the Erie from the west gives to Olean certain advantages in the way of manufacturing because of the freight rates on material in transit which is taken advantage of by the large tanning factory to be referred to later.

In the hills and valleys around Olean are found deposits of oil and gas which have had a great effect on both the natural development of the country and on the purity of the streams. The petroleum industry in Cattaraugus county began near the village of Limestone — about twelve miles distant from Olean — and in 1878 there were more than 250 wells in the township of Carolton alone. Olean is the center of distribution both of crude oil and of the refined product. In the valleys to the north and west of Olean are some 300 oil tanks, each with a capacity of about 30,000 barrels. From these tanks two 6-inch pipe lines extend to the seaboard through which 35,000 barrels of oil can be delivered each day. Of more immediate importance to the living conditions at Olean are the refineries which, through fractional distillation, subdivide the crude oil as it comes in from Ohio and from the local wells into its more valuable separate components. The largest plant in Olean engaged in this refining work has 49 stills and refines 5,000 barrels of oil per day. On account of the presence of the oil wells and the refineries, from which more or less waste oil must be expected to find its way onto the ground and into the streams, it cannot be hoped to maintain the waters of the main stream and of the tributaries liable to oil contamination in such a condition as to afford a pure water in the river and branches. The presence of the oil and a due appreciation of its effects must be considered in establishing a standard of purity for the streams.

According to the 1910 census Olean has a population of 14,743. It was thirty-third in size among the cities of the State, having advanced in the ten years 1900 to 1910 from forty-first in rank to the thirty-third, as just stated. A considerable part of this advance in rank, however, is due to the fact that in 1909 the suburban villages of North Olean, Boardman and East Olean were annexed to the city, thus increasing its population by about 4,000.

Evidence of civic interest is found in the fact that two large and handsome public buildings have recently been erected in the center of the city, the buildings being a new post-office and a public library. The city building, which has hitherto been used by the post-office, lacks in many ways the appointments necessary for convenient and rapid administration of city business, while the city jail, now in the basement of this building, should not be tolerated even for the temporary residence of criminals.

The sewers of the main city of Olean discharge into the Allegheny river, but North Olean, which discharges partly into Two Mile creek and partly into the Olean creek in its village days, was provided with two sewage dis-

posal plants. The pollution of the river on account of the s
is noticeable in the dry weather and undoubtedly the time wi
purification plant will be built. Until within a few years
due to sewage was aggravated by the location of tanneries, w
their wastes into the river and creek. With the lessened amo
bark in the vicinity and with the greater distance from which
be obtained, the five tanneries formerly present in Olean have
reduced to a single large and important plant. This has re
and put into execution a purification plant for its wastes so
pollution of any amount entering the river is that from the ci

Vital Statistics

The general death rate for the past 22 years (*1890–1911*) is
which is very low when compared with the rates of the State.
the death rate for the State, which in that year reached the lo
has ever had, was 15.5 — 1.4 higher than the average for Olean
the 10-year period 1900–1910 the average rate for the State was
the 10-year period preceding was 18.6 — from 3.8 to 4.5 higher
But the State as a whole includes both country and city popula
comparison with Olean we may properly take the death rates in
eliminating the effect of rural population. The average death
cities of New York State for the past 10 years (1900–1909) is
again is higher than the average rate in Olean by 3.7. It woul
seem to be justifiable to claim that, insofar as it can be determ
general death rate, the sanitary condition of Olean compares fav
that of the State and with that of the other cities of the State.

TABLE 1

Showing the Population, the Number of Deaths and the Death
1,000 Population in Olean for the Years 1890 to 1911 Inclu

YEAR	Population	Number of deaths
1890	6,832	147
1891	7,095	162
1892	7,358	154
1893	7,621	162
1894	7,884	110
1895	8,147	120
1896	8,410	120
1897	8,673	99
1898	8,936	82
1899	9,199	106
1900	9,462	130
1901	9,602	110
1902	9,742	117
1903	9,882	99
1904	10,022	138
1905	10,163	122
1906	11,079	139
1907	11,995	138
1908	12,911	139
1909	13,827	211
1910	14,743	188
1911	15,155	209
Average	....	....

Table 1 gives the population, the number of deaths and the deat
per 1,000 population in Olean for the period 1890 to 1911, and Fi
shows the rates plotted graphically with similar rates for the Stat
whole for comparison. Two characteristics are to be noted: *First, th*

Figure No. 1

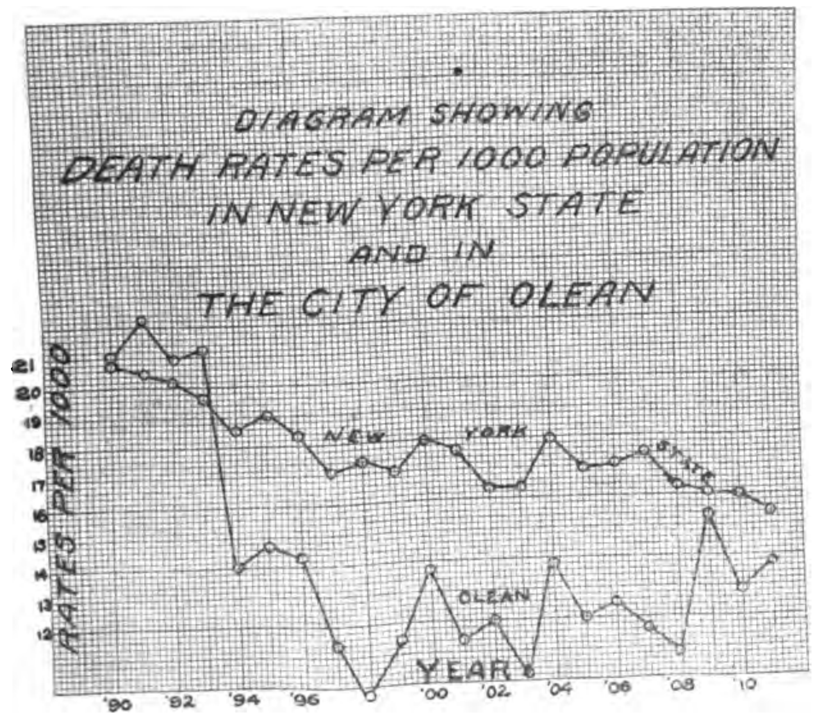


DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF OLEAN
RATES PER 1000
21
20
19
18
17
16
15
14
13
12
NEW YORK STATE
OLEAN
YEAR
'90
'92
'94
'96
'00
'02
'04
'06
'08
'10

curve for the State is a smoother curve with fewer violent disturbances than that for the city. This is, to be sure, partly accounted for by the much greater population of the State, so that the excess rates in one city are counterbalanced by low rates in another. But formerly the curve for the State showed the same irregularities that now appear in the city's curve and it is one of the unmistakable indications of advance in civilization and in the greater control over preventable diseases that the general death rate becomes more uniform year by year. Such a difference as is found in the Olean rate between the years 1903 (rate, 10.8) and 1909 (rate, 15.3) is an indication of local and peculiar conditions which should be studied and controlled by the local health authorities.

Second, the low rate in Olean is plainly due to the low rates between the years 1897 and 1908, the reduction in death rates between 1890 and this period being very marked. It would be of considerable interest and perhaps advantage to determine the reason for the abrupt and very marked reduction beginning in 1893, but such a study is outside the range of the general investigation of this report. Since 1903, however, the tendency of the death rate is apparently to increase and if the cause of the earlier reduction can be found it may, perhaps, offer a method of checking this upward tendency. With the State the effect of precautionary measures and municipal control over preventable diseases, together with the constantly advancing gain in general civilization, has caused a gradual reduction in the death rate so that whereas in 1890 the death rate was 20.8, in 1911 it was 15.5.

It may properly be added, perhaps, that, although the death rate in the State for 1911 is the lowest ever experienced, the rates in New York State are always high compared with other States. In general New York State has the unenviable record of being among the few highest States in order of death rates. The following table (Table 2) shows the death rates in several States for the four-year period 1901–1905 and by years from 1904 to 1909.

TABLE 2

Showing the Number of Deaths per 1,000 Population in Certain States of the Registration Area

STATE	Annual average 1901 to 1905	DEATHS PER 1,000 POPULATION					
		1904	1905	1906	1907	1908	1909
New York	17.1	18.0	17.0	17.1	17.5	16.3	....
Maryland	....	....	....	15.7	16.1	15.5	....
Connecticut	16.0	15.9	16.5	16.7	17.1	15.4	....
Michigan	13.3	13.6	13.3	14.3	13.9	13.8	13.1
Indiana	13.0	13.5	12.8	12.5	12.5	12.3	....

It will be noticed that in Michigan for the past ten years the rate has been continually below 14 and in Indiana it has been between 12 and 13. It follows, therefore, that while the rate in Olean has been low compared with standards obtained from this State's records, the rate is high compared with the more successful rates in other States.

Other countries, too, have rates compared with which even the rates of the cities as a whole are high. Thus in Table 3 it may be seen that the Scandinavian countries have rates lower than New York State and have been able to hold these rates for a long period of years. England, too, has rates, which, in view of its large cities and general density of population, are low and compared with which the average rate for Olean, with its small population and low density, does not compare so favorably.

TABLE 3

Showing General Death Rate per 1,000 Population of Foreign Countries

COUNTRY	Annual average, 1901 to 1905	1904	1905	1906	1907
Australian Commonwealth	11.7	11.0	10.8	10.8	10.8
Austria	24.2	23.7	25.0	22.5	....
Belgium	17.0	16.9	16.5	16.4	....
Denmark	14.8	14.1	15.0	13.5	14.2
France	19.6	19.4	19.6	19.9	20.6
German Empire	19.9	19.6	19.8	18.2	....
Italy	21.9	21.1	21.9	20.8	20.8
Norway	14.5	14.3	14.8	13.6	14.2
Spain	25.8	25.4	25.4	25.6	24.0
Sweden	15.5	15.3	15.6	14.4	14.6
Switzerland	17.7	17.8	17.9	17.0	....
England and Wales	16.0	16.2	15.2	15.4	15.0

With respect to typhoid fever, Olean, of late years, has had rates which compare favorably with the rates of the State. Table 4 shows the population of the city, the deaths from typhoid fever and the death rates per 100,000 population for the past twenty-two years and Figure 2 shows these rates plotted together with similar rates for New York State. It will be noticed that the rates of the city since 1897 are, with the exception of 1902 and 1903, all low, and the average for these last fifteen years is 15.3, which is lower than that of the State as a whole for the same period. Prior to 1897, however, the death rates from typhoid fever are high, apparently the same conditions producing a high general death rate causing a large number of deaths from typhoid fever in that year. It has been found by experience and statistics that it is quite possible, in cities where proper supervision is exercised over the quality of the water and milk in the northern parts of the United States to maintain a typhoid fever death rate below 20, and it is not unreasonable to expect that rate to be reduced one-half as sanitary precautions gain further headway. The average rate of Olean for the past twenty-two years is 25.8, at least 10 per 100,000 more than the maximum permitted where the city is under good sanitary control.

Figure No. 2

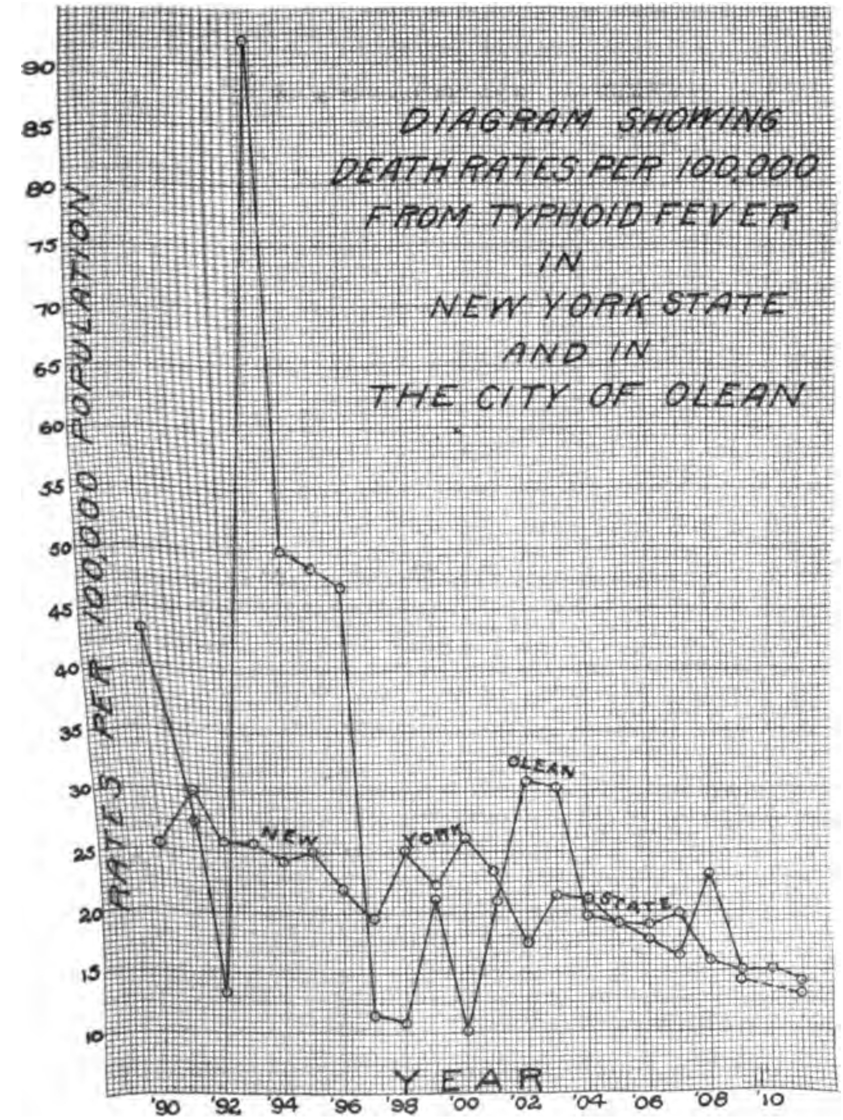


Fig. 2.

TABLE 4

Showing the Population, the Number of Deaths from Typhoid Fever, and the Death Rate per 100,000 *Population in the City of Olean for the Years* 1890 *to* 1911 *Inclusive*

YEAR	Population	Number of deaths from typhoid fever	Death rate per 100,000 population
1890	6,832	3	43.9
1891	7,095	2	28.2
1892	7,358	1	13.6
1893	7,621	7	91.9
1894	7,884	4	50.7
1895	8,147	4	49.1
1896	8,410	4	47.6
1897	8,673	1	11.5
1898	8,936	1	11.2
1899	9,199	2	21.7
1900	9,462	1	10.6
1901	9,602	2	20.8
1902	9,742	3	30.8
1903	9,882	3	30.4
1904	10,022	2	20.0
1905	10,163	....	....
1906	11,079	2	18.1
1907	11,995	2	16.7
1908	12,911	3	23.2
1909	13,827	2	14.5
1910	14,743	....	....
1911	15,155	2	13.2
Average			25.8

Considering only the number of deaths and the size of the city, two deaths from typhoid fever in Olean should be considered a maximum number and any deaths exceeding this number should be considered a cause for alarm and greater activity on the part of the local board of health. In 1893 there were seven deaths, constituting for Olean an epidemic, since it has been found that with each death there is generally present about ten cases of illness. In that year there were five deaths and fifty cases of illness, presumably, which might have been prevented and which were presumably due to imperfect control of some sort of food supplies. The cost to Olean, in that year, of these unnecessary deaths was not less than $50,000, as such costs are usually figured. In each of the years 1894, 1895 and 1896 there were twice as many deaths as should occur and in 1902 and 1903 one more. The fact, however, that since 1897 the number of deaths has been relatively few, that there has been no very marked variation, that in the two years, 1905 and 1910, no deaths occurred and that the average for these fifteen years is but 16, shows that the conditions likely to produce typhoid fever in Olean have apparently ceased to exist, leaving the rate normal and corresponding almost exactly with that of the State as a whole. In order to demonstrate the correspondence of the rate in Olean during these last fifteen years with that of other cities in the State where it is known that conditions favoring the development of typhoid fever have been eliminated, the following table has been prepared:

TABLE 5

Showing the Death Rates per 100,000 *Population, from Typhoid Fever in Certain Cities of New York State for the Years* 1904 *to* 1910

CITY	1904	1905	1906	1907	1908	1909	1910
New York	16.9	15.8	15.5	17.4	12.8	12.7	11.6
Rochester	15.2	10.5	16.2	14.3	11.6	8.6	13.7
Syracuse	14.7	14.5	9.2	11.8	15.2	11.1	27.5
Binghamton	9.6	12.0	9.1	18.2	15.2	13.1	12.4

In small cities the tabulation of statis
therefrom are not as conclusive as in larg
traction of a single death may change m
be drawn from the statistics. But in the
low rates for the past fifteen years offers
that the drinking water of the city is un
almost certainly by sewage of any kind, a
cause typhoid fever, such as infected milk
ducing this disease. It is, however, to be
relaxed and that the record of the past, wh
ipality and particularly to the sanitary offici
unabated.

TABLE 6

Showing the Population, the Number of Deat the Death Rate per 10,000 Population i 1911 Inclusive

YEAR	Po
1890	
1891	
1892	
1893	[illegible]
1894	7
1895	8
1896	8
1897	8,
1898	8,
1899	9,
1900	9,
1901	9,6
1902	9,7
1903	9,8
1904	10,02
1905	10,16
1906	11,07
1907	11,99
1908	12,91
1909	13,827
1910	14,74
1911	15,15
Average	

Turning now to the deaths of children under five, a
will be seen that while the average number of deaths
living is 36.6 for the same twenty-two year period, the
able, ranging from 86.1 in 1890 to 16 in 1904. Th
United States, in Massachusetts and in New York is a
the average is below the normal, there are years when i
It is creditable to the city that the high rates are all
rates since 1896 exceeding 40. It is interesting to note
which reduced the number of deaths from typhoid fev
also to reduce the number of deaths of children. The
about the average in the State, being 23.4 in Olean i
the cities of the State. In 1910 it was somewhat lower,
for the State. It is reasonable to assume, therefore, th
dren in Olean is normal, and that, therefore, that fa
the interpretation of the death rate of children. The
be so many deaths under five if there are fewer childr
Thus, in Austria, where the birth rate is 36, the deaths
were 46 per cent. of all the deaths, while in France, wh
21, the deaths of children were only 23 per cent. In

Olean was 27 per cent., while in the State it was 17.8. Without knowing exactly the number of children living in a community, one cannot definitely determine the full meaning of the death rate of children, but, in spite of the low rates of recent years in terms of the total population, together with the normal birth rates, and in spite of the fact that the ratio of the number of deaths under five to total deaths is higher than for the State, one is forced to the conclusion that there is no serious or glaring cause for alarm shown by the deaths of children.

Compared with other cities of the State of the same size, where it is known that sanitary standards are high, as in Ithaca or Geneva, the relative number of children being kept in mind, Olean has no more deaths of children in terms of the births than either. Thus, in 1910, the ratio of births to deaths under one year was 7.7 in Geneva, 10.4 in Ithaca and 6.5 in Olean. The corresponding figures for 1911 were 8, 8.8 and 10.2. There are, then, about 10 per cent. of the children born who die the same year, but the three cities have practically the same rates, which are normal and reasonable in all cases. This is of peculiar interest since insanitary conditions of the milk supply, a large amount of organic matter in the water supply, crowded and ill-ventilated tenements and certain conditions of labor, all make themselves felt in a high death rate among young children who are particularly sensitive to impurities in articles of food and to unhealthy environment.

The inference to be drawn, then, from these statistical studies is that the tendency shown by the general death rate in the last three years is upward, although since 1896 the average death rate has been remarkably low. In fact, a rate so low as that shown in 1903 (10.2) raises the question of whether all the deaths were reported that year. Rates below 12 are not likely in the average city of this State and a succession of low rates, as from 1897 to 1903, cannot but suggest the possibility of incomplete returns, so that the enviable record may misrepresent the actual facts. The other facts brought out are all indicative of good sanitary conditions and give no signs of needed improvement.

Water Supply

The water supply of Olean comes from a series of driven wells, the number reported by the municipality being fifty, which have been driven in a low meadow alongside the river and which are connected up with a pump well on the other side of the stream. These wells are all of 6-inch pipe and are driven from twenty-five to seventy-five feet down. The meadow in which the wells are located is subjected to overflow at times of high water in the river and the manholes which are built over the connections between the two vertical pipes and the horizontal connecting lines are undoubtedly often flooded. The wells are driven through clay soil down to the waterbearing gravel and the probabilities are that this flooding does not interfere with the quality of the water, but analyses of the water before and after such flooding would be necessary to establish the fact. Besides the supply which comes from these wells, on the north side of the Allegheny river, there is a supplementary well on the south side (known as the Cook well), from which water is also pumped. This well is an open well, twenty-five feet in diameter and sunk to a depth of forty-five feet on a sill by interior excavation. Normally, water stands both in the open well and in the gang wells at the level of the river water and by pumping this level is lowered about nine feet. There is no evidence to show whether the water in the wells is intercepted ground water on its way to the river or whether it is seepage from the river toward the wells. Analyses would here also be able to establish the facts but none are available. The water from the wells flows into a pump well whence it is lifted to two reservoirs on the slope of Mount Herman, about 1,700 feet above the sea level and about 250 feet above the city. These reservoirs hold 200,000 gallons each, the older one being lined with brick on clay puddle and the newer one of concrete directly on the shale in which both reservoirs are excavated.

TABLE 7

Report of Water Analyses of the City of Olean

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, p supp
Collected on	4/ 9/08	6/ 3/08	7/30/08	3/2
Color	Trace	....	....	T
Turbidity	Clear	....	....	T
Odor, cold	....	....	....	....
Odor, hot	....	....	....	....
Total solids	218.	....	....	219.
Loss on ignition	....	....	....	....
Mineral residue	....	....	....	178.
Nitrogen as:				
Free ammonia	.032	....	....	.
Albuminoid ammonia	.030	....	....	.
Nitrites	.003	....	....	.
Nitrates	.36	....	....	.
Oxygen consumed	.50	....	....	.
Chlorine	15.	....	....	14.
Total hardness	150.	....	....	149.
Alkalinity	....	....	....	142.
Bacteria per c.c	1,200.	2,700.	2,500.	65.
B. coli type:				
10 c.c	Absent	Absent	Absent	Ab
1 c.c	Absent	Absent	Absent	Ab
1/10 c.c	....	....	Absent	Ab

Source	City supply (Wells in flooded district)	City supply	City supply	Cit supp
Collected on	5/13/09	5/17/09	5/24/09	8/15
Color	Trace	1.	1.	1.
Turbidity	10.	13.	20.	1.
Total solids	232.	225.	221.	217.
Mineral residue	189.	195.	179.	189.
Nitrogen as:				
Free ammonia	.022	.044	.034	.
Albuminoid ammonia	.058	.068	.120	.
Nitrites	.004	.001	.003	.
Nitrates	0.40	0.40	0.30	0.
Oxygen consumed	0.40	0.85	1.90	0.
Chlorine	15.00	15.00	14.50	13.
Total hardness	160.	151.	140.	154.
Alkalinity	145.	148.	138.	145.
Bacteria per c.c	600.	220.	55.	12,000.
B. coli type:				
10 c.c	Absent	Absent	Absent	Pres
1 c.c	Absent	Absent	Absent	Abs
1/10 c.c	Absent	Absent	Absent	Abs

Source	Tap, City Hall	Tap, City Hall	Tap, public supply	Tap, pu supply
Collected on	10/27/09	9/27/09	11/30/09	12/30/
Color	Trace	....	Trace	Tra
Turbidity	Clear	....	2.	Tra
Total solids	218.	....	225.	229.
Mineral residue	184.	....	205.	195.
Nitrogen as:				
Free ammonia	.012	....	.022	.00
Albuminoid ammonia	.024	....	.078	.00
Nitrites	.003	....	.003	......
Nitrates	0.50	....	0.40	0.60
Oxygen consumed	0.20	....	0.50	0.90
Chlorine	29.50	....	17.50	17.00
Total hardness	140.	....	180.	163.
Alkalinity	145.	....	176.	157.
Bacteria per c.c	640.	5,500.	90.	170.
B. coli type:				
10 c.c	Absent	Absent	Absent	Absen
1 c.c	Absent	Absent	Absent	Absen
1/10 c.c	Absent	Absent	Absent	Absen

TABLE 7 — (*Concluded*)

Report of Water Analyses of the City of Olean — Concluded

Source	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	2/18/10	3/ 7/10	4/20/10	6/ 5/10	8/ 4/10
Color	....	3.	....	....	....
Turbidity	....	5.	....	....	....
Total solids	....	203.	....	....	....
Mineral residue	....	173.	....	....	....
Nitrogen as:					
Free ammonia	....	.032	....	....	....
Albuminoid ammonia	....	.048	....	....	....
Nitrites	....	.003	....	....	....
Nitrates	....	0.30	....	....	....
Oxygen consumed	....	0.20	....	....	....
Chlorine	....	10.75	....	....	....
Total hardness	....	146.	....	....	....
Alkalinity	....	140.	....	....	....
Bacteria per c.c	40.	1,900.	220.	....	3,900.
B. coli type:					
10 c.c	Absent	Present	Absent	Absent	Absent
1 c.c	Absent	Absent	Absent	Absent	Absent
1/10 c.c	Absent	Absent	Adsent	Absent	Absent

Source	Tap, public supply	Tap, public supply	Cook well	Tap, City Hall	Tap, public supply	Tap, public supply
Collected on	11/23/10	12/22/10	2/ 1/11	2/ 1/11	4/17/11	6/ 8/11
Color	Trace	....	....	....	5.	10.
Turbidity	Clear	....	....	....	Trace	2.
Odor, hot	....	....	....	....	1 veg.	1 veg.
Odor, cold	....	....	....	....	1 veg.	1 veg.
Total solids	234.	....	....	....	162.	245.
Loss on ignition	....	....	....	....	11.	46.
Mineral residue	188.	....	....	....	151.	199.
Nitrogen as:						
Free ammonia	.004	....	....	....	.010	.004
Albuminoid ammonia	.012	....	....	....	.068	.040
Nitrites	.001	....	....	....	.005	.002
Nitrates	.050	....	....	....	0.40	0.40
Oxygen consumed	0.40	....	....	....	0.80	0.50
Chlorine	14.25	....	....	....	12.00	13.50
Total hardness	171.	....	....	....	149.	160.
Alkalinity	163.	....	....	....	147.	155.
Bacteria per c.c	80.	12.	400.	70.	20.	6,600.
B. coli type:						
10 c.c	Present	Absent	Present	Present	Absent	Absent
1 c.c	Absent	Absent	Absent	Absent	Absent	Absent
1/10 c.c	Absent	Absent	Absent	Absent	Absent	Absent

Source	Tap, city building	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Collected on	6/27/11	9/22/11	11/24/11	1/20/12	2/23/12	2/24/12
Color	....	5	Trace	Trace	....	Trace
Turbidity	....	Clear	Clear	Clear	....	Clear
Odor, cold	....	1 veg.	1 veg.	1 veg.	....	1 veg.
Odor, hot	....	1 veg.	1 veg.	1 veg.	....	1 veg.
Total solids	....	246.	211.	214.	....	178
Loss on ignition	....	44.	16.	21.	....	12.
Mineral residue	....	202.	195.	193.	....	166.
Nitrogen as:						
Free ammonia	....	.022	.022	.016	....	.020
Albuminoid ammonia	....	.020	.032	.032	....	.030
Nitrites	....	.001	.002	.002	....	.003
Nitrates	....	0.60	Trace	0.40	....	0.52
Oxygen consumed	....	0.60	0.30	1.20	....	0.50
Chlorine	....	13.75	13.50	12.50	....	12.87
Total hardness	....	169	131.	177.	....	150.
Alkalinity	....	159.	157.	156	....	119
Bacteria per c.c	300.	....	30.	850.	30.	50
B. coli type:						
10 c.c	Absent	....	Absent	Present	Absent	Absent
1 c.c	Absent	....	Absent	Absent	Absent	Absent
1/10 c.c	Absent	....	Absent	Absent	Absent	Absent

The slopes above the reservoirs are pasture and opportunity w the time of the inspection, for polluting wash to enter the new r was suggested to the authorities that this, in the future, be pr that the waters from a small spring which was allowed to enter t be cut off so that the supply be restricted solely to the water from

A 24-inch pipe line leads from the wells to the reservoirs and pipes carry the water back to the city, the pressure in the city system being entirely due to gravity. Cross connections, howev vided so that the pumps can discharge directly into the city main pressure provided especially if needed at times of fire.

Table 7 shows the results of the analyses of the water supp made by the State Hygienic Department from April 9, 1908, to F 1912. These analyses show that, in general, the quality of the w and suitable in all respects for use as a domestic supply. On som however, this statement must be modified. For example, on Augu although in all other respects the water was as good as on othe the bacterial count was 12,000, and on the 30th of the same montl from the Cook well, a part of the system, contained 50,000 bacte On other occasions the number of bacteria has ranged from 1,00 although the normal amount would seem to be something less than indication of occasional pollution is strengthened by the fact that cal analyses indicate differences in the quality of the water at the when the bacterial showing suggests the same disturbing element. May 5, 1909, when the water in the river was high and flooded t which the wells are driven, the chlorine was reduced from its norm 15 to 9.87, while at the same time the chlorine found in wells flooded district was 15. Later analyses in May, 1909, and in Au an amount of cholorine of 14 and 15 parts per million. In October analysis shows 29.5 parts per million, although no other part of th is unusual. The organic matter present is generally low, the free never rising above .04 and the albuminoid ammonia, except in on .12, not rising above .08. The nitrates are high for surface water b well water. On April 17, 1911, the nitrates amounted to .8 parts pe this being strong evidence of the probability that the water at that t from the land side rather than from the river; that the nitrates a from vegetable rather than animal pollution, as indicated by the fa no case except once (May 5, 1909) were bacteria of the B. coli type any except 10 c. c. samples. On this occasion, the area was flooded luted river water and apparently the low chlorine indicated the sa The wells themselves were evidently contaminated by the flooded wa five other occasions the tests for B. coli were positive in 10 c. c. sam in two of these cases the bacterial count was very low so that the f of no particular importance. The conclusion must be reached, theref the water in general is good, free from organic matter and not subje terial pollution. There must, however, be recognized the danger to th of the water from the occasional flooding of the well areas and it wo to be only a reasonable precaution to take steps to prevent, in the futu flooding of the low-lying ground.

Conclusions and Summary

1. Olean is a small city on the Allegheny river, noteworthy as bein middle of the oil-producing area of New York State and as being th large oil refining and tanning industries. The distribution systems f water and sewage cover practically the whole city and there are no s unfavorable conditions of housing.

2. The general death rate is low when compared either with the S a whole or with the cities of the State. Indeed, the rate in some year low as to raise a question as to the accuracy of the death registration

3. The death rate from typhoid fever for the past fifteen years ha low and has corresponded closely to that of the State as a whole. I conditions as these death rates represent can be maintained, no critic Olean as to the prevalence of typhoid fever can be made.

4. The death rate among young children, since 1897, has been low and compares favorably with other cities of the State which are of the same size as Olean and in which sanitary conditions are known to be carefully looked after.

5. The water supply comes from driven wells from 25 to 75 feet deep and from a dug well 45 feet deep. The analyses show that at times the water contains an excessive amount of organic matter and a high bacterial count. Bacteria of the B. coli type, however, are rarely found except in large (10 c. c.) samples. There seems to be the possibility that, when the river is in flood and covers the meadow in which the pipes are located, the water in the wells is affected, either by direct access or by indirect seepage. In view of the typhoid fever statistics and those of deaths of children, it is believed that such pollution, if it exists, has not, as yet, resulted in any serious outbreaks of disease.

Recommendations

1. It is recommended that the water board arrange for an expert examination of the driven well system to determine what possibilities exist of contamination of the well waters by the river water at time of flood.

2. It is further recommended that, in case such examination shows any defects in the driven well system which would make possible the pollution of the well waters by means of the overflowing of the meadow by river water, effective steps be taken to minimize this danger, either by dyking the meadow, by raising the walls of the well chamber, or by such other means as may be found expedient.

3. It is recommended that the local board of health, acting under section 22 of the Public Health Law, shall consider the matter of registration of vital statistics of the city, with special reference to the accuracy and completeness of the returns and shall, if any inaccuracies are found, exercise their powers with a view to insuring complete and full returns.

4. It is recommended that the local board of health examine the conditions attending the deaths of children, particularly those dying from diarrhea and enteritis, with a view to reducing the number of such deaths by improvement of sanitary surroundings with such legislation as may seem to them to be needed.

Respectfully submitted,
HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the other city authorities, urging that steps be taken to carry out the recommendations contained in the report.

ONEIDA

ALBANY, N. Y., *January* 10, 1912.

MR. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on the sanitary condition of the city of Oneida, particularly as affected by the quality of the water supply. The visit to Oneida on which this report is based was made in June, 1911, and the studies of statistics have been made during the month of December, 1911.

The city of Oneida lies on Oneida creek at the point where the latter embouches into the low lying area surrounding Oneida lake. Its distance from the lake is seven miles in a straight line, the distance along the creek, however, being nearly twice that distance. The New York Central & Hudson River Railroad, which follows along the foot of the higher land to the south, passes directly through the city and the West Shore Railroad is a little to the south of the center of the city. The New York, Ontario and Western Railroad, following along the valley of Oneida creek runs northerly through

the city crossing both of the above-named railroads. The Eri miles north of Oneida but a feeder from Oneida creek passes d the city emptying into the canal at Durhamville, just west of tl crossing. The side slopes of Oneida creek valley to the south the run-off is heavy, so that the flood flows of the stream cau of from six to ten feet, overflowing a large area of bottom land ally rising into the built-up portion of the city.

Oneida is the center of a large and important agricultural ar of unusual commercial importance. The city has a few small ind lishments, so that, compared with other cities of the State, it h the same rank, whether based on population or on the products ture. Flouring mills, a knitting mill, a coffin factory and a can make up the list of factories, none of which are of material co health of the city. The canning factory, because of the nature products, is of interest in any discussion of the pollution of Oneic of possible dangers to health resulting therefrom.

Sewerage and Drainage

The drainage of the city has been well cared for by a system of stalled in 1896 and now extending throughout the entire area o This system discharges from two outlets into Oneida creek and line takes the waste waters from the large canning factory alreac to. The subsoil is porous and contains large quantities of water, of which is that the sewer system carries large amounts of seepage same time acts as subsoil drains in keeping the level of the grounc the same elevation as the sewers.

TABLE 1

Showing Number of Deaths and Death Rate per 1,000 Population i
1890-1910

YEAR	Population	Number of deaths	D p pc
1890	6,018	79	
1891	6,050	65	
1892	6,083	95	
1893	6,264	67	
1894	6,446	80	
1895	6,628	98	
1896	6,810	96	
1897	6,992	96	
1898	7,174	93	
1899	7,356	90	
1900	7,538	86	
1901	7,714	111	
1902	7,890	108	
1903	8,086	111	
1904	8,213	112	
1905	8,420	131	
1906	8,400	131	
1907	8,380	128	
1908	8,359	134	
1909	8,338	139	
1910	8,317	117	

A great deal of complaint in years past has been based on the conditio the feeder which passes through the business part of the city under the n street and at the rear of stores, saloons and restaurants. In volumes 27 28 of the Annual Reports of the Department may be found reports and scriptions of the insanitary accumulations found in this feeder.

Figure No. 1

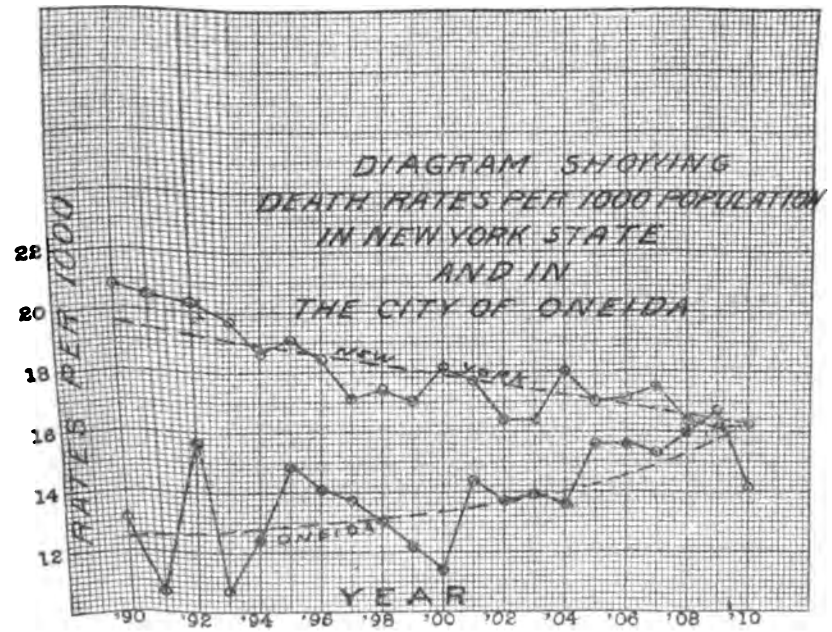


DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF ONEIDA
RATES PER 1000
22
20
18
16
14
12
NEW YORK
ONEIDA
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

Vital Statistics

The general death rate per 1,000 population in Oneida is, at most times, low and compares favorably with the general death rate in other cities and countries. Table 1 shows the population, the number of deaths annually in the city, and the death rate per 1,000 for the twenty-one years, 1890 to 1910, inclusive. It will be noted that the minimum death rate (10.7) occurred in 1891 and 1893, and that, while the average for the twenty-one years is 13.7, the higher rates have occurred in the last six years. The highest rate is in 1909 (16.7) and the average for the six years, 1905 to 1910, is 15.6. In order to show the meaning of this death rate when compared with that of other cities and countries, the following comparisons may be made.

Figure 1 shows the general death rate of New York State for the past twenty years and it is plainly to be seen how marked is the downward tendency of this death rate. In 1890, the rate in the State was 20.8, and, subject to minor variations, it has been steadily decreasing until the present time. In the past three years it has been but little more than 16 and at the same time that the rate is decreasing the irregularities of the curve, that is, the variations of the rate from year to year, have been decreasing. It will be noted that there is, in the city of Oneida, no such downward tendency in the death rate and that, while in general the rates are lower than that of the State, the increasing rate of the last few years, if continued, will soon cause the Oneida rate to be greater than that of the State.

The death rate in New York State, however, is relatively high when compared with other States, its rate being as high as second, and never lower than fifth, among the registration States. The following table, Table 2, shows the annual death rates of some of the States in the Union for the past nine years and it is plainly to be seen that the Oneida rate, which is apparently below the normal, when compared with the rate for the State as a standard, is above the normal when compared with the average of other states for a standard. In Michigan, for example, the death rate for the past ten years has been below fourteen and is practically identical with the death rate of Oneida for the past twenty-one years, but 2 per 1,000 lower than that of Oneida for the past six years. The death rate in Indiana has been between 12 and 13 for the average and while it may be that some inaccuracies in the death rate of Indiana are due to imperfect registration and to the relatively large proportion of adult males in the population, yet the advantages of the sanitary conditions under which the sparse population throughout the rural districts live and the hygienic surroundings of the citizens in small towns undoubtedly is shown to a large extent in this reduced death rate.

TABLE 2

Showing Number of Deaths per 1,000 Population in Certain States of the Registration Area

STATE	Annual average 1901 to 1905	DEATHS PER 1,000 POPULATION					
		1904	1905	1906	1907	1908	1909
New York	17.1	18.0	17.0	17.1	17.5	16.3	......
Maryland	....	......	......	15.7	16.1	15.5	......
Connecticut	16.0	15.9	16.5	16.7	17.1	15.4	......
Michigan	13.3	13.6	13.5	14.3	13.9	13.8	13.1
Indiana	13.0	13.5	12.3	13.5	12.5	12.3	......

Compared with other cities of the State, Oneida occupies a happy position. For the year 1905 to 1909, the lowest death rate for any city was at Ithaca, the rate being 11.9, and the highest rate for the same period was at Troy, with a rate of 21. The rate for Oneida, 13.7, for the twenty year period indicates, so far as the death rate is a criterion, a satisfactory condition of public hygiene in the city. Only four cities have a lower rate than this, the other forty-four cities having higher rates. The rate for the last six years,

TABLE 3

Showing Number of Deaths from Typhoid Fever and the Correspon Rate per 100,000 Population in Oneida, 1890–1910

YEAR	Population	Number of deaths from typhoid fever
1890	6,018	....
1891	6,050	....
1892	6,083	1
1893	6,264	....
1894	6,446	1
1895	6,628	2
1896	6,810	1
1897	6,992	2
1898	7,174	2
1899	7,356	2
1900	7,538	1
1901	7,714	2
1902	7,890	3
1903	8,066	....
1904	8,243	3
1905	8,420	....
1906	8,400	1
1907	8,380	....
1908	8,359	2
1909	8,338	....
1910	8,317	4

however, 15.6, changes this position in the scale so that twenty- have lower death rates and sixteen cities higher death rates, maki twenty-third in rank, judged by the death rate, instead of fifth.

With respect to typhoid fever, sometimes called the filth disease, show the conditions to be marked by extreme variability. Table 3 number of deaths from typhoid fever in Oneida since 1890, togethei death rate per 100,000 population, and Figure 2 shows these rates with corresponding rates for typhoid fever in the State for the sar As with the general death rate, the characteristic of the rate for is the downward tendency, particularly since 1891. In that year, for the State was 30.5, and since that time it has greatly decreased, 1909 and 1910, it has been 15.1, the lowest value ever reached in t The corresponding rates for Oneida do not show any serious epi typhoid fever but there is in some years an excess of deaths from thi A city of the size of Oneida with a normal typhoid fever death ra have, on the average, not more than one death from typhoid fever In the twenty-one years shown in the table, this number of deaths exceeded nine times, or about half of the time, and it is disturbing that, in 1910, the largest number of typhoid fever deaths occurred, four.

In a small city, the tabulation of statistics and the inference to b therefrom are not as conclusive as in larger cities, since the addition traction of a single death materially changes the conclusions which drawn from the statistics. Experience in cities and countries whe tation is carefully considered, where the public water supply is ab picion and where no well waters, the quality of which is at all in d used, shows that the typhoid fever rate may be held as low as ten per and in no case should rise above twenty per 100,000. By reference to 2 it will be noticed that the city of Oneida has not been able to maint ideal condition. It is also to be remembered that for each death from fever there are usually from eight to ten cases of sickness so that i it is probable that there were in the city during the year at least thirt of typhoid fever, a number which is too large to account for by moven population or by any cause except local conditions.

Figure No. 2

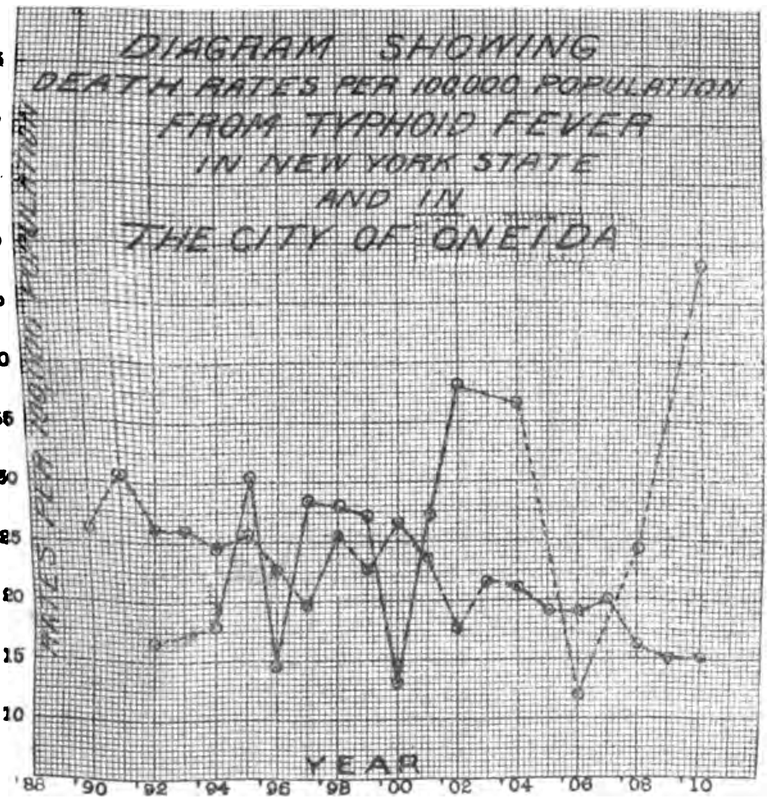


DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF ONEIDA
65
60
55
50
45
40
35
30
25
20
15
10
YEAR
'88
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

The cause of typhoid fever has generally been found to be either polluted water or infected milk, although of late years much stress has been laid on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible, without further investigation, to say to which of these causes the number of cases in Oneida is due and it must be left to the local health authorities to so examine the quality of the water supply, the character of the milk distributed and the sanitary condition of the residences and of the drains and canals in the city as to be sure that they have taken every precaution to prevent a recurrence of further cases of illness.

TABLE 4

Showing Number of Deaths under Five Years and the Corresponding Death Rate per 10,000 *Population in Oneida,* 1890–1910

YEAR	Population	Number of deaths under 5 years	Death rate per 10,000 population
1890	6,018	18	29.9
1891	6,050	22	36.4
1892	6,083	18	29.6
1893	6,264	13	20.8
1894	6,446	15	23.3
1895	6,628	14	21.1
1896	6,810	16	23.5
1897	6,992	13	18.6
1898	7,174	16	22.3
1899	7,356	9	12.2
1900	7,538	14	18.6
1901	7,714	10	13.0
1902	7,890	16	20.3
1903	8,066	10	12.4
1904	8,243	9	10.9
1905	8,420	22	26.1
1906	8,400	25	29.8
1907	8,380	20	23.9
1908	8,359	14	16.8
1909	8,338	15	18.0
1910	8,317	26	31.3

Turning to the deaths of children under five years (see Table 4), the same variation and lack of downward tendency in mortality rates is to be noted. Under normal conditions the death rate of children under five years is about 50 per 10,000, a rate reached in Oneida in no year of the twenty-year period. Variation, however, is shown from the fact that, in 1904, the death rate was 10.9, and in 1891 and 1910, was over 30. The indications are that since children of tender age are especially susceptible to unhygienic conditions and respond most promptly to digestive disturbances caused by impure milk or polluted water, the variable death rate shows a lack of proper control and of uniform conditions. The actual significance of the rate itself cannot be ascertained without a correction based upon the number of children in the city as compared with the normal proportion of persons of various ages and also without a correction based upon the social conditions and the general care exercised over children in that particular city. Manifestly, if the number of children in a city is smaller than normal, the number of deaths of children must also be small, irrespective of any living conditions. The variability of the rate, however, is an indication of improper care in the homes of the children, and must be remedied by more active work on the part of the sanitary authorities.

The inference to be drawn, then, from the statistical studies which we have made is that while, in general, the health conditions in Oneida are such as to promote a low death rate and a low mortality rate from typhoid fever, and while the death rate of children under five is apparently low, yet there must be present in Oneida conditions which have interfered and are still interfering with the downward tendency of mortality rates exhibited through the

State as a whole and that there are present
cause unaccountable and sporadic variations
festly the duty of the health authorities to d
ations and to take such steps as shall bring t

Water Supply

The water supply of Oneida is a surface su
two miles south of the city. There is prol
water also discharged directly into the strea
is about two square miles, largely of steep hi
partly wooded. The shores of the reservoirs
covered with bushes and small second growth a
pollution of the reservoirs themselves *possible*
highways on each side of the valley bottom a
edge of the watershed are about sixteen *hous*
outbuildings, constitute the chief source *of* con
good quality of the water. Appare*ntly* there is
of household wastes into the stream but the *an*
that organic matter finds its way into t*he water*
watershed. In any case, the steep *h*illside and
together constitute a potential source of poll*utio*
moval of the houses and barns and the *disuse* of th
remove.

The natural conditions of the valley are a*dmirab*
the full the possibilities of storage and *ad*vantage h
natural conditions. The original dam built in 1884
about 22,000,000 gallons and in 1906 a *second dam* c
upstream from the first, formed a second *reservoir*, h
Since the daily consumption is less than 1,000,000, *th*
than two months consumption. The *quantity* suppl
found to be sufficient.

The original works were built by a private com*pany*
were acquired by the village by whom *many extensi*
have been carried out. Some trouble has *been* experien
growth of algae in the reservoirs, but of late years *the*
sulphate has been successful in minimiz*ing this* growth.
leads from the reservoir to the city so that the continu
dependent upon the integrity of the two miles of *12-in*
suitable and proper by-passes arranged so that *water* can b
reservoir at will or the water from the upper may be let d
and the supply taken from there.

The quality of the water leaves much to be *desired*. It i
hardness ranging from 350 to 650 and averaging about *500*
the water on this account is so great that practically *all the*
water cisterns in the cellars from which water *is* pumped
laundry purposes. This requires additional cost for *water*
tracts from the convenience which a public water *supply sho*

The corrosive and encrusting action of the water on accou
contained is objectionable and much complaint is made *becau*
wear and failure of plumbing fixtures. Whipple says *that* a h
100 parts per million may be called "very hard" and that alt
parts of the country hardness of 200 or 300 is observed, *these m*
"excessive." Whipple also estimates the cost of hard *water* to a
basing the estimate solely on the additional amount of soap consu
account. Having determined by actual experiment that water *w*
of 20 parts per million required soap at the rate of *three* tons
gallons to produce a lather and that 200 pounds of soap, in add
needed for each additional part per million increase in hardness, *he*
the cost of softening water for any assumed hardness. *By* his t
assuming that only one gallon per head per day is used with soa
would need to soften 8,000 gallons per day or 1/125 of a million *gal*
parts per million of hardness require about 50 tons of *soap per* millio

TABLE 5

Report of Water Analyses for the City of Oneida

Collected on	2/10/10	5/ 3/10	6/30/10	9/22/10	11/11/10
Collected from	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Color	15.	18.	10.	12.	35.
Odor, hot	2 musty	2 veg.	2 veg.	1 veg.	2 veg.
Odor, cold	1 musty	1 veg.	1 veg.	1 veg.	1 veg.
Turbidity	5.	25.	1.	5.	15.
Solids, total	1,011.	740.	876	1,153.	935.
Loss on ignition	171.	220.	167.	270.	162.
Mineral residue	840.	520.	709.	883.	773.
Nitrogen as:					
Ammonia, free	.038	.040	.004	.012	.012
Ammonia, albuminoid	.034	.056	.052	.174	.160
Nitrites	.008	.002	.001	.004	.001
Nitrates	0.20	0.40	Trace	0.04	Trace
Oxygen consumed	1.90	2.60	1.40	3.97	2.95
Chlorine	17.25	7.25	9.50	16.25	11.25
Hardness, total	657.	511.	529.	586.	464.5
Alkalinity	175.	148.	146.	136.	163.
Bacteria per c.c.	1,400.	650.	7,800.	200.	600.
B. coli communis	Present	Present	Not present	Present	Present
Collected on	12/20/10	1/23/11	4/ 7/11	5/24/11	7/ 8/11
Collected from	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Color	15.	25.	15.	15.	15.
Odor, hot	2 veg.	2 veg.	2 veg.	1 veg.	1 veg.
Odor, cold	1 veg.	2 veg.	1 veg.	1 veg.	1 veg.
Turbidity	10.	10.	15.	15.	Trace
Solids, total	1,010.	824.	536.	866.	852.
Loss on ignition	165.	147.	120.	178.	105.
Mineral residue	845.	677.	416.	688.	747.
Nitrogen as:					
Ammonia, free	.050	.116	.036	.020	.008
Ammonia, albuminoid	.118	.102	.116	.082	.054
Nitrites	.003	.012	.003	.002	.001
Nitrates	Trace	0.30	0.60	0.10	0.10
Oxygen consumed	3.72	2.90	3.30	3.00	8.00
Chlorine	16.25	12.25	6.00	9.50	10.00
Hardness, total	483.	486.	350.	485.5	586.
Alkalinity	178.	173.	118.	140.	152.
Bacteria per c.c.	650.	5,500.	3,200.	300.	200.
B. coli communis	Present	Present	Present	Present	Not present

and nearly 1,000 pounds per day for the 8,000 gallons of water softened in Oneida. At five cents per pound, this is $50 per day for soap, but so distributed among 8,000 persons, that it amounts to only about three cents per family per day and is not noticed. Fifty dollars per day, however, is $16,250 per year, which represents, after taking out $5,000 a year for operating expenses, the interest on $265,000, the sum which might be spent to remove the hardness of the water. Nor does such an estimate of the value of softened water consider the advantages coming from the decreased corrosion of fixtures and the consequent reduced plumbers' bills nor the relief coming from the possibility of using city water for all purposes so that rain water cisterns will no longer be needed.

But the element more especially to be considered in connection with the quality of the water is its bacterial content. Table 5 gives the analysis of the water as made by the State Hygienic Laboratory for the years 1910 and 1911. The organic matter present in ammonia form is generally low, but on January 11 both the free and albuminoid ammonia exceeded 0.1 parts per million, although in the dry weather of summer both drop to about 0.05 parts. A free ammonia value of more than .05 parts per million is generally suggestive of organic pollution and when, as in January, 1911, the amount of free ammonia is relatively greater than the albuminoid ammonia, the indications are that the water has been polluted by organic matter of animal origin. Since the summer flow is free from this indication, it is probable that the wash

from the hillsides at times of melting snow or heavy rains i: the pollution and that either wastes from the vicinity of the l manure on the fields causes the pollution. The nitrites, indi composition, are generally present, although in a pure water tl found. Any amount more than .002 parts per million is an u cation and in the analyses given, this amount is generally nitrates, showing the results of decomposition, are absent i and in an ordinary potable water do not exceed 0.1 part per analyses given, this value is, perhaps, an average, the maxim April 7, 1911. But it is in the bacterial determinations that tive index of the quality of the water is to be found. The l and the indications of colon bacillus are here repeated in Tab

TABLE 6

Showing the Results of the Determination of the Number o the Presence of B. Coli Type in Oneida City Water Specified

DATE	Number of bacteria per c.c.	B. coli
February 11, 1910	1,400	Present in 10 c.
May 25, 1910	650	Present in 10 c.
July 9, 1910	7,800	Absent.
October 10, 1910	200	Present in 1 c.c.
November 11, 1910	600	Present in 10 c.
January 11, 1911	650	Present in 10 c.
February 10, 1911	5,500	Present in 1 c.c
April 8, 1911	3,200	Present in 1 c.c.
June 12, 1911	300	Present in one ou
July 20, 1911	200	Absent.

It will be noticed that in the ten analyses the count is und all but three occasions and that four times out of ten the cour than 1,000. The very same conclusions must be drawn as tho the chemical analyses, namely, that there is surface wash from bringing organic matter into the reservoirs. The further fact t two occasions out of the ten was the B. coli type absent c roborates the other indications and more specifically indicates p fecal matter. From the appearance of the watershed it is probal pollution is due to manure on the pasture land, but the dange houses and their inmates is also present and the analyses cannot between animal and human contamination.

To remedy the present condition either more of the watersh changed from pasture to woodland or some purification proce installed. Fortunately no epidemic of fever has occurred in O haps only because there has been no initial case on the watershe the infection. A surface water which has, as in February, 1911, teria per c. c. and has B. coli communis in 1 c. c. samples, cann sidered a safe drinking water and it is manifestly the duty of authorities to so modify present arrangements that the evidence of may be eliminated. Outwardly the stream and the reservoir seem can be desired for a safe water supply. The surroundings seem distant from habitation. An intercepting ditch has been dug in keep direct drainage from the reservoirs. Woods border the str seem to protect the waters from soil wash. But all the scientific points to the fact that pollution is present and that therefore the ever present danger of an epidemic from some water-borne disease.

Experience has show that when a hard water is subjected to a s process a considerable bacterial purification is effected, particularly plants where the removal of the precipitated salts is brought about b

filtration through sand. By the addition of a small amount of aluminum sulphate better coagulation can be obtained and a greater bacterial purification obtained. Even with sedimentation alone from 75 to 90 per cent. purification may be expected and with the addition of a small amount of coagulant and rapid filtration following the softening process and desired purification may be obtained. If the water contains magnesia, then the addition of the lime used for softening acts effectively as a coagulant and the addition of any other coagulating agent is not in general necessary.

Conclusions

1. The general death rate of Oneida while low in the past has been steadily increasing and is now equal to that of the State as a whole.

2. The typhoid fever death rate is variable, some years no deaths occurring and in 1910 a rate of 48.1 being found. The tendency here as with the general death rate is upward instead of downward.

3. The water comes from storage reservoirs and is subject to the rapid run-off from steep hillsides on which are pasture land and some sixteen houses.

4. The chemical and bacterial analyses both show evidences of pollution. There is often considerable organic matter present, decomposition processes are generally active and while the organic matter is undoubtedly at times of vegetable origin the high bacterial counts and the presence of fecal organisms at other times indicate unquestionably that there is constant danger of animal contamination.

The chemical analyses indicate also what is well known in the city by actual experience, namely, that the water is very hard and not suitable for ordinary domestic uses.

Recommendations

1. It is recommended that careful and regular inspections be made of all the buildings on the watershed to determine whether any obvious means by which surface wash can carry the wastes from barnyards, pigpens or privies into the stream exist; and if such means exist that measures be taken to eliminate such possibilities.

2. It is recommended that a plant for softening the water supply be installed and that in connection therewith a mechanical filter or other suitable device be built so that an adequate bacterial purification may be obtained contemporaneously with the softening of the water.

Respectfully submitted,
HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the other city authorities urging that the recommendations contained in the report be carried out.

PLATTSBURG

ALBANY, N. Y., *May* 11, 1912.

Mr. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR:— I have the honor to hand you herewith a report on the sanitary condition of the city of Plattsburg, particularly as affected by the quality of its water supply. The visit to Plattsburg on which this report is based was made in July, 1911, and the studies of statistics have been made during the month of April, 1912.

The city of Plattsburg lies on the west shore of Lake Champlain near its northern end. Directly in front of the city a large bay is formed by the extension of an isthmus from the mainland to the southeast, the name of the bay, Cumberland, being also that of the head or isthmus. In this bay in 1814 the American forces won a signal victory over the British fleet and

at the same time the American army repul
was threatening the city. Very much of ot
to this place, its position on the north anc
and the United States giving it strategic in
The Saranac river, which drains the no
dacks, including the three Saranac lakes, e
Plattsburg and to this stream and its wat
ance of the city is largely due. The Delaw
railroad passes through the city enroute fro
starts its branch lines to Lake Placid and t
making it an important railroad point.

The site of the city is generally level from
which is 100 feet above the sea. The gradu
by the construction of four dams, at interval
with a fall of about 15 feet. The estimated
square miles, so that there is in all the falls
1,000 horsepower, even in the dry season. The
pig iron, flour, pulp and paper, sewing machine

According to the United States Census of 19
cities and villages of the State, ranked forty-six
sixty-fifth in order of values of manufactured
noted that by the same census, there are only
ries of all kinds, the number of proprietors being
ers per factory of between six and seven. It is e
facts that in spite of its water power possibilit
manufacturing city but is far below the average
value of its manufactured products.

There is an important military post, well garri
men, about a mile south of the city. There are
Catholic schools for girls and boys, homes for age
the Champlain Valley Hospital.

Although incorporated as a village before 1800
increased but slowly, reaching 11,138 by the 1910
the density of population is low and the communit
cultural.

The sewers of the city are on the combined plan a
into the river and lake. The river shows indications c
at times and complaints have been made of the nuis
(37th Annual Report, page 874.)

Vital Statistics

The general death rate of the city for the past twenty
1911) is 15.9, a rate which is apparently not high when
rest of the State. Thus, the death rate for the State a
was 15.5, and for the ten-year period 1900–1910 was 1
periods, the comparison is even more favorable for P
shown by Table 1.

TABLE 1

Showing Death Rates in Plattsburg and in New York State b

	1890-1894	1895-1899	1900-1
New York State	30 0	17.4	17
Plattsburg	16.4	16.5	15.

But the State as a whole is made up of many cities in whic
rate is affected by conditions of congestion not found in Platt
this account and because the Adirondack region is supposed to

Figure No. 1

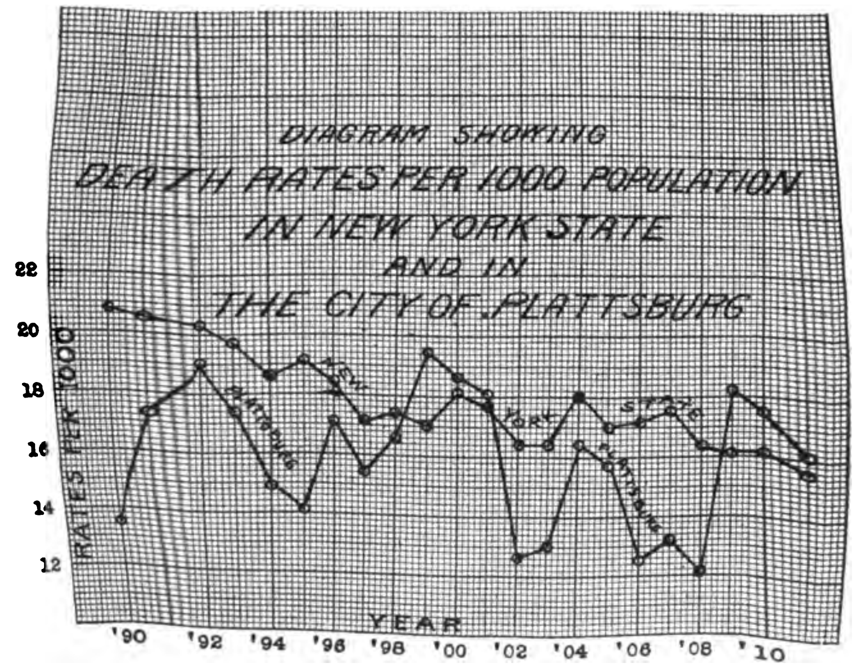


DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF PLATTSBURG
RATES PER 1000
22
20
18
16
14
12
NEW YORK STATE
PLATTSBURG
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

cially healthful properties, it is interesting to find that in the nine counties of this region the death rate for 1900–1904 was 13.8 and for 1905–1909 was 15.3; that is, in the first half of the decade, Plattsburg had a rate 1.9 higher than the surrounding territory and in the latter half 1 lower. The health conditions in Plattsburg therefore as based on the average general death rate and compared with either the State as a whole or with the Adirondack region are good.

TABLE 2

Showing the Population, the Number of Deaths Annually and the Death Rate per 1,000 in the City of Plattsburg for the Years 1890–1911 Inclusive

YEAR	Population	Number of deaths	Death rate per 1,000 population
1890	6,654	90	13.5
1891	6,832	118	17.3
1892	7,010	133	19.0
1893	7,188	125	17.4
1894	7,366	110	14.9
1895	7,544	107	14.1
1896	7,722	132	17.1
1897	7,900	122	15.4
1898	8,078	134	16.6
1899	8,256	160	19.4
1900	8,434	157	18.6
1901	8,784	159	18.1
1902	9,134	115	12.6
1903	9,484	123	13.0
1904	9,834	161	16.4
1905	10,184	160	15.7
1906	10,374	130	12.5
1907	10,565	139	13.2
1908	10,756	130	12.1
1909	10,947	199	18.2
1910	11,138	195	17.5
1911	11,329	182	16.1
Average	....	....	15.9

Table 2 gives the population, the number of deaths and the death rates per 1,000 population in Plattsburg for the period 1890 to 1911 and Fig. 1 shows the rates plotted graphically with similar rates for the State as a whole for comparison. Two peculiarities are to be noted. First, that the curve for the State is a smoother curve with fewer violent variations than that for the city. This is, to be sure, partly accounted for by the greater population of the State on account of which the average death rate is more uniform, excess rates in one part of the State or in one city being offset by lower rates in other parts or in other cities. But formerly the curve for the State showed the same irregularities that now appear in the curve for the city and it is well understood that one of the evidences of improvement in sanitation in any community is the lessening both of the number and the extent of the variations from the normal in such a curve as that shown in Fig. 1. The variations in the Plattsburg curve are so marked as to suggest forces at work which are outside of the natural forces causing death and which must be due to irregular and spasmodic causes, presumably of a nature which can be brought under control. Such differences are are found, for example, between the years 1892 (rate, 19) and 1895 (rate, 14.1); or between 1901 (rate, 18.1) and 1902 (rate, 12.6); or between 1908 (rate, 12.1) and 1909 (rate, 16.2), are apparently evidences of epidemic diseases which should be controlled by the local health authorities and which indicate insanitary conditions not taken into account.

Again, although the average rate for Plattsburg (15.9) is relatively low and below that of the State for this twenty-two year period, yet during the years 1899 and 1901 the Plattsburg rate was higher than that of the State

as it has also been for the last three years. Compared witl ing the last three years, Plattsburg has had a high death rat the rate for all the cities of the State was 15.9; in 1910, l 15.4, an average of 13.8. During this same period, the avera was 17.3 — 1.5 higher. Again, the death rate for the State ous downward tendency, very plainly indicated graphica Plattsburg, however, shows no such downward tendency, tl in which the rate is high and then periods when the rate is seems to be at work causing a continuously lower rate a must be that there is little or no improvement in sanitary ing the death rate. It is a sad commentary on the sanita of Plattsburg, that while in both the State as a whole and ir State, the death rate is declining, due undoubtedly to a be sanitation and a more thorough appreciation of the value o the death rate in Plattsburg is as high in recent years as t and in spite of salubrious conditions of housing and of cli both cases has been abnormally high.

With respect to typhoid fever, Plattsburg compares favora of the State. Table 3 shows the population of the city, the phoid fever and the death rates per 100,000 population for two years and Figure 2 shows those rates plotted together w for New York State. It will be noticed, that except in 1898, the rate exceed 40 per 100,000 and that otherwise, except ir 1905, the rate does not get above 30. It has been found b statistics that it is quite possible, in cities where proper sup cised over the quality of the water and milk supplies in the the United States, to maintain a typhoid fever death rate be not unreasonable to expect that rate to be reduced one-half, a ress gains further headway. The average rate for Plattsbu twenty-two years is 21.1 and this apparently gives Plattsbu being one of the cities of the State in which the typhoid fev well under control. It should be noticed, however, that in deaths occurred and since 1905 the rates have all been above

TABLE 3

Showing the Population, the Number of Deaths from Typhoid Death Rate per 100,000 Population in the City of Plat Years 1890 to 1911 Inclusive

YEAR	Population	Number deaths fr typhoid f
1890	6,654	
1891	6,832	
1892	7,010	....
1893	7,188	
1894	7,366	
1895	7,544	
1896	7,722	
1897	7,900	
1898	8,078	
1899	8,256	
1900	8,434	
1901	8,784	
1902	9,134	
1903	9,484	
1904	9,834	....
1905	10,184	4
1906	10,374	3
1907	10,565	3
1908	10,756	....
1909	10,947	3
1910	11,138	3
1911	11,329	....
Average	....	....

Figure No. 2

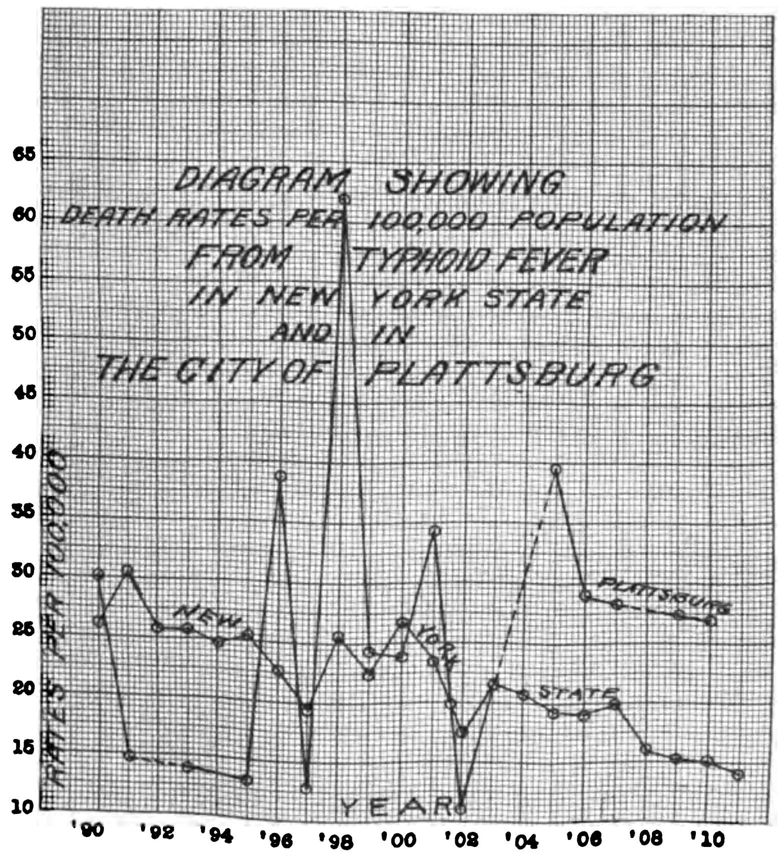


DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF PLATTSBURG
RATES PER 100,000
YEAR
NEW YORK STATE
PLATTSBURG
65
60
55
50
45
40
35
30
25
20
15
10
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

ing the number of deaths and the size of the city, two deaths from typhoid fever in Plattsburg should be considered a maximum number and any number of deaths greater than this should be cause for alarm and for greater activity on the part of the local board of health. In 1898, there were five deaths, the largest number of the twenty-two year period, and since 1905 there have been one or two more deaths each year than the number above suggested. Since one death is usually accompanied by about ten cases of illness not fatal, it means that, if by proper institution of health measures, the number of deaths from typhoid had been held down to two each year, then in the last five years, sixty cases of typhoid fever would have been saved as well as the six additional deaths not justified by our present knowledge of preventive measures.

In order to demonstrate the possibility of lower rates from disease than has been shown of late in Plattsburg, Table 4 has been prepared, showing death rate in other cities of New York State.

TABLE 4

Showing Death Rates per 100,000 *Population from Typhoid Fever in Certain Cities of New York State, for the Years* 1904 *to* 1910

CITY	1904	1905	1906	1907	1908	1909	1910
New York	16.9	15.8	15.5	17.4	12.8	12.7	11.6
Rochester	15.2	10.5	16.3	14.3	11.6	8.6	13.7
Syracuse	14.7	14.5	9.2	11.6	15.2	11.1	27.5
Binghamton	9.6	12.0	9.1	18.2	15.2	13.1	12.4

In a small city the tabulation of statistics and the inference to be drawn therefrom are not as conclusive as in larger cities since the addition or subtraction of a single death may change materially the conclusion which may be drawn from the statistics. But in the case of Plattsburg, the repetition of three or four deaths from this disease each year would seem to show that it is not accidental but that the high rate is due to local conditions which should be investigated. In the State as a whole, the efforts of the sanitary authorities and the greater appreciation of sanitary truths is shown by the gradual reduction in the typhoid fever death rate. In 1891 this rate was 30.3 and in 1911 it was 14.7 — a reduction of more than one-half and which has been accomplished gradually year by year. The curve for the State in Fig. 2 shows this marked downward tendency. In Plattsburg, however, a tendency upward rather than downward can be observed. In the six-year period, 1890–1895, the average number of deaths per year was 1. In the eight-year period 1896–1903, the average number of deaths per year was 2.4. In the six-year period 1905–1910, the average number of deaths was 3.7. This increase in the number of deaths and the failure of Plattsburg to respond to the influences which are in other parts of the State active in reducing the typhoid fever death rate is perhaps the most alarming feature of the study of the typhoid fever statistics.

The cause of typhoid fever has generally been found to be either polluted water or infected milk, the latter causing in general about 5 per cent. of the total number of deaths. Recently, also, much stress has been laid, particularly in southern States, on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible without further investigations to say to which of these causes the occasionally large number of deaths and presumably the many accompanying cases of typhoid fever in Plattsburg have been due and it must be left to the local health authorities to so examine local conditions, the sanitary surroundings of the residences, the character of the milk

distributed, and the quality of the water suppl
have taken every precaution to prevent a furthe
amount of this disease and if possible to reduc
It may even be found that the deaths reported
originating in Plattsburg, but, on account of the
Valley Hospital, are all of them brought in fro
or from the railroad. In this case, of course, no
ness will be found and the previous history of
the localities where infection is likely to have

Turning now to the deaths of children unde
will be seen that while the average death rate
per 10,000 population is 48.7, there have been
was more than 65. Out of the twenty-two year
in ten and 60 in three of these years. According
States Census Bureau, the normal or average
under five in terms of the population is about
this rate is not constant or uniform because of
number of children present in different commu
deaths of children under five is manifestly affect
the number of children and in a community where
is few, the death rate will be correspondingly
where the birth rate is 35 per 1,000, the deaths
years were 46 per cent. of all the deaths, while in
rate is 21, the deaths of children were only 23 pe
the ratio of deaths of children to total deaths i
intermediate condition between Austria and France
rate in Plattsburg was 20.9, a rate which is belo
birth rate for the State. There would seem, then,
more children in Plattsburg than the normal, whi
children in terms of the population is in many y
normal. In 1910, 53 children under one year of ag
number of births during that year was 282, that is
or nearly one-quarter of all these children died before
year. In other years, as in 1901, the proportion of
greater.

It is always significant to find a high death rate a
they are practically susceptible to organic impurities
the water supply and also to overcrowding in unventi
again, it must be left to the local health authoritie
cause of this large number of deaths of children an
proper steps to reduce the present number. It is not,
of impure milk, since the number of deaths from di
low. The relatively low death rates from typhoid fe
indicate that it was not due to any appreciable extent t
supply, particularly in view of the fact that the inspe
writer did not reveal any serious cases of pollution on
is more than likely that this high death rate among c
Plattsburg to conditions of living and to improper car
the remedy for which must be education, with perhaps
as an aid.

TABLE 5

Showing the Population, the Number of Deaths of Children under Five Years and the Death Rate per 10,000 Population in the City of Plattsburg 1890-1911

YEAR	Population	Number of deaths under five years	Death rate per 10,000 population
1890	6,654	32	48.1
1891	6,832	36	52.7
1892	7,010	36	51.4
1893	7,188	43	59.8
1894	7,366	30	40.7
1895	7,544	27	35.8
1896	7,722	41	53.1
1897	7,900	42	53.2
1898	8,078	40	49.5
1899	8,256	39	47.2
1900	8,434	47	55.7
1901	8,784	58	65.8
1902	9,134	36	39.4
1903	9,484	44	46.4
1904	9,834	45	45.8
1905	10,184	55	54.1
1906	10,374	48	46.3
1907	10,565	37	35.0
1908	10,756	37	34.4
1909	10,947	67	61.2
1910	11,138	67	60.1
1911	11,329	40	35.3
Average			48.7

The final inference, therefore, to be drawn from these statistical studies is that the tendency shown by the general death rate does not indicate improvement as does the rate for the State as a whole; that the death rate for the past three years has been higher than the rate for the State in spite of the better conditions peculiar to the locality in which Plattsburg is situated; that the typhoid fever death rate is somewhat irregular and, while low and without marked epidemics, nevertheless fails to show any decline in rate but rather a slow and gradual increase; that the deaths of children under five are large and while the number of children, judged by the birth rate, is less than normal and while the average death rate per 1,000 population is normal, there are years when the infant death rate is far in excess. So far as could be learned, the city has no conditions of drainage or of living which would account for this high death rate among children but special study was not made on this point and it would involve inquiry into causes of death and the conditions of life before death of each of the decedents. It is manifestly the duty of the health authorities who have the health interests of the city at heart to consider the increase in typhoid fever, the recent high death rate from all diseases and the high rates among children and determine the causes and take steps to bring them under control.

Water Supply

The water supply of Plattsburg is obtained from surface waters in the Dannemora hills west of the city, the daily consumption being estimated at 2,600,000 gallons, or nearly 250 gallons per head. The water works are owned by the municipality and date back to the year 1869 when about $300,000 was expended in the original construction. Besides supplying the city itself, the plant also furnishes water to the United States government

army barracks where about 1,500 men are quartered and to the hotel at Bluff Point about three miles south of the city. The original system consisted of two distributing reservoirs, each holding one and a half million gallons, located two miles west of the city. From these distributing reservoirs, the two 13-inch pipes continue about four miles further west to two ponds known as Sandburn pond and Robinson pond. From these one 18-inch pipe extends about a mile and a half to a storage reservoir on Sandburn or West brook, the capacity of this being about 32,000,000 gallons. Another 18-inch pipe extends about the same distance to a small pond on Mead brook, holding about 4,000,000 gallons.

About 1906, the quality of the water was questioned by citizens and by authorities at the barracks and the result of the agitation was a movement, since carried out, to provide a larger reservoir on West brook, and to discontinue the use of the reservoir on Mead brook, the latter being evidently subject to a great amount of contamination. A hearing was given by the State Water Supply Commission and on the 27th of February, 1907, permission was given to the city of Plattsburg to purchase land along the upper reaches of West brook and to construct a dam for the purpose of storage. At the time of the inspection by the writer the dam had been built although the completion was so recent (summer of 1911) that the reservoir had never been filled.

The character of the watershed is in general admirable, being on high upper rolling country with but few houses and no villages or hamlets. There is a large portion of the watershed covered with second growth timber and the decision of the Water Supply Commission authorizes the Water Commission of the city to acquire lands for the purpose of removing dwellings and reforesting the denuded areas. Some of the area adjacent to the brook is situated so that the water coming down the hill sides through the farm yards, cesspools, pig sties and so on, carries into the streams a large amount of contaminating matter. It is hoped and believed that in the course of time it will be possible for the city to acquire all of the watershed and by the removal of dwellings and other buildings, prevent such further contamination. The inspection of the writer noted very little contamination in the immediate vicinity of the upper part of West brook. The farm houses existing are well back from the stream and no direct drainage therefrom was observed. On one part of the watershed is a saw mill property where direct drainage from pig pens and stables into the stream is inevitable and in another part some outbuildings are located so near the bank or precipitous bluff as to make pollution almost certain. The watershed is, however, compared with other watersheds, not badly contaminated and the carrying out of a policy of purchasing areas as fast as possible and devoting them to forest will give to the city an unusually pure and satisfactory water supply.

The analyses, however, show at present a quality that must be viewed with suspicion. Table 6 following gives the results of the analyses made by the State Hygienic Laboratory from February 22, 1910, to February 7, 1912. The amount of organic matter present is shown by a great portion of albuminoid ammonia, for example, ranging from .034 on March 8, 1911, to .314 on September 4, 1911. The nitrites also are occasionally high as on June 6, 1910, and on February 7, 1912. The bacterial count is usually low although on June 5, 1910, the count from the stream just above the reservoir showed 6,300. The other counts are all low and do not indicate excessive pollution. The presence of bacteria of the B coli type is found only occasionally and in no case in 1/10 c. c. samples. On March 24, 1910, and on September 4, 1911, 1 c.c. samples showed the presence of these bacteria. A majority of the 10 c.c. samples show these forms but this may be expected in surface waters where the watershed is used for agricultural purposes. It is not too much to say that the indications of the analyses are that the water is subject to surface pollution chiefly of a vegetable nature and that the analyses confirm the evidence of the

studies of the death rates, namely, that the water supply is not responsible to any great extent for the spread of water-borne diseases. It may be pointed out that the new reservoir as built is likely to cause tastes and odors on account of the shallowness of the water and the consequent high temperatures involved in the summer time. It is well known that for best results, the depth of water in a reservoir should be at least eight feet, this depth tending to reduce the amount of decomposition and the development of vegetable growth. There must be in the new reservoir large areas not more than two or three feet deep and it would be of great advantage to the quality of the water if, as opportunity offered, the reservoir was deepened and the increased depth secured. When the reservoir was built a road was interfered with and a new location made

TABLE 6

Report of Water Analyses of the City of Plattsburg

Collected on	2/22/10	3/24/10	6/5/10	6/5/10	6/6/10
Source	Mead brook	Mead brook	Stream just above reservoir	Reservoir near inlet	Tap, public supply
Color	Trace	30	....	....	10
Turbidity	Trace	160	....	....	20
Odor, cold	1 veg.	2 musty	....	....	1 veg.
Odor, hot	1 veg.	2 musty	....	....	2 veg.
Total solids	145.	100.	....	....	90.
Loss on ignition	15.	44.	....	....	35.
Mineral residue	130.	56.	....	....	55.
Nitrogen as:					
Free ammonia	.010	.002	....	....	.004
Albuminoid ammonia	.012	.196	....	....	.082
Nitrites	.001	.001	....	....	.002
Nitrates	0.30	0.30	....	....	0.40
Oxygen consumed	0.80	6.50	....	....	2.10
Chlorine	1.25	0.50	....	....	1.25
Total hardness	129.	41.6	....	....	47.1
Alkalinity	127.	39.	....	....	42.
Bacteria per c.c	....	1,000.	14,500.	8,300.	....
B. coli type:					
10 c.c	....	Present	Present	Present	....
1 c.c	....	Present	Absent	Absent	....
1/10 c.c	....	Absent	Absent	Absent	....

Collected on	9/23/10	9/23/10	3/8/11	9/4/11	9/4/11
Source	Distributing reservoir	Tap, public supply	Tap, public supply	Reservoir No. 1	Reservoir No. 2
Color	5	....	Trace	25	....
Turbidity	2	....	Trace	5	....
Odor, cold	1 aromatic	....	1 veg.	1 veg.	....
Odor, hot	1 veg.	....	1 veg.	1 veg.	....
Total solids	136.	....	174.	147.	....
Loss on ignition	24.	....	22.	27.	....
Mineral residue	112.	....	152.	120.	....
Nitrogen as:					
Free ammonia	.018	....	.022	.008	....
Albuminoid ammonia	.100	....	.024	.314	....
Nitrites	.001	....	.003	.002	....
Nitrates	.08	....	0.30	Trace	....
Oxygen consumed	2.07	....	1.80	4.8	....
Chlorine	1.00	....	1.25	1.00	....
Total hardness	111.	....	131.	117.	....
Alkalinity	110.	....	119.	115.	....
Bacteria per c.c	....	700.	40.	....	350.
B. coli type:					
10 c.c	....	Present	Absent	....	....
1 c.c	....	Absent	Absent	....	Present
1/10 c.c	....	Absent	Absent	....	....

TABLE 6 — (*Conclu*

Report of Water Analyses of the City o

Collected on	10/4/11	11/13/
Source	Tap, public supply	Tap, pu suppl
Color	15	10
Turbidity	Trace	Cle
Odor, cold	1 veg.	2 ve
Odor, hot	1 veg.	2 ve
Total solids	144.	171.
Loss on ignition	22.	26.
Mineral residue	122.	145.
Nitrogen as:		
Free ammonia	.022	.010
Albuminoid ammonia	.094	.050
Nitrites	.002	.001
Nitrates	0.06	0.10
Oxygen consumed	1.90	1.90
Chlorine	0.75	0.87
Total hardness	120.	129.
Alkalinity	119.	122.
Bacteria per c.c.	190.	110.
B. coli type:		
10 c.c.	Present	Present
1 c.c.	Absent	Absent
1/10 c.c.	Absent	Absent

across the upper end of the reservoir, crossing the
bridge. It would seem that this was most unfortu
a tight floor should be made on the bridge to pr
water in the immediate vicinity of the reservoir.

Conclusions

1. Flattsburg is a well located agricultural co
material sanitary advantage due to climate and enviro
tion systems for both water and sewage cover practi
and there are apparent no specially unfavorable condi
of labor.

2. The general death rate, although the average is l
either with the State as a whole or with the Adironda
Plattsburg is located, yet at times rises to undesirable
present in Plattsburg periodic waves of high and low
amplitude of which is large and the crest of which rise
of the State as a whole. During the past three years t
been exceptionally high and above the normal for the Sta

3. The death rate from typhoid fever is irregular and
high, showing the influence of conditions directly responsil
rates. The fact that high rates have occurred in recent y
the State-wide tendency to lower rates, should be a cause f
minds of those charged with preserving the good health of

4. The death rate among young children is apparently hi
in view of the fact that the birth rate and therefore the num
of tender age is below the normal. This is an indication of
gent care of infants as well as a sign of the possibility o
and drink, probably of either water or milk.

5. The water supply is a surface one from the slopes of th
mountain, somewhat subject to organic pollution and at poin
slight amounts of human pollution, largely, however, of indire
The analyses show at times a large amount of undecomposed or
but the bacterial analyses indicate animal and possibly also
tamination at only infrequent intervals. It is believed that t

is chiefly due to foreign matter of a vegetable origin, and only slightly, if at all, of a disease-producing character.

Recommendations

1. It is recommended that the water board persevere in their policy of removing from the watershed buildings which directly or indirectly drain into and pollute the sources of the water supply.

2. It is also recommended that the water board cause regular and frequent inspections to be made of the watershed and particularly of those fields where agricultural areas are found and that the inspectors employed travel on foot in order to examine the areas adjacent to the main stream and its tributaries carefully and in detail.

3. It is also recommended that the shallow places in the new reservoirs be either deepened or filled in so that the development of organic growths be discouraged.

4. It is recommended that the local board of health take under consideration the increasing death rates in the city, the irregularity of the typhoid fever death rates, and the number of deaths of children with a view of instituting such reforms in the quality of foods supplied by dealers, in the cleanliness of the market milk, in the oversight of infectious diseases, particularly in the schools, and generally in the conditions of living throughout the city that the death rates may be decreased and the expectation of life correspondingly increased.

Respectfully submitted,
HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the city board of water commissioners and to the other city authorities, urging that the recommendations contained in the report be carried out.

ROME

ALBANY, N. Y., *February* 15, 1912.

MR. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on the sanitary condition of the city of Rome, particularly as affected by the quality of the water supply. The visit to Rome on which this report is based was made in July, 1911, and the studies of statistics have been made during the month of January, 1912.

The city of Rome lies at the eastern edge of the low plain surrounding Oneida lake. Historically, the site is interesting since the old fort that guarded the carry between the Mohawk river, the end of navigation from Albany, and Wood creek, the beginning of navigation from Oneida lake through the Clyde and Oswego rivers to the wide-spreading west, was built within the limits of the present city. Because of the slight rise of land at this point, the Mohawk river coming from the north bends abruptly to the southeast and Wood creek coming also from the north, parallel to the Mohawk river, bends equally abruptly to the northwest. The city occupies the area between the two streams, a distance of about a mile, east and west, and a little more than that, north and south. The site of the old fort is preserved

in the center of the city and a number of tablets indicate of the more interesting features of the old fortifications.

The New York Central Railroad, coming from Syracuse, ern edge of the city and then bends abruptly away to follov Mohawk. The Rome, Watertown and Ogdensburg Railroac New York Central, runs from Rome northerly to Watertov cent and a branch of the New York, Ontario and Western ru necting with the main line at Clinton.

The Black River canal, formerly an important tributary Erie canal, runs from Rome northerly along the Mohawk it taps the Black river at Lyons Falls. This canal is now feeder of the Rome summit level, drawing on the Black rive estport reservoir.

The barge canal, now under construction, will utilize Woc improve the run-off from the area in the vicinity of this sluggish and unnavigable. The construction of a large rese hawk at Delta, six miles north of the city, a reservoir de water to the summit level of the new barge canal, will mat floods on the Mohawk river which have, at times, seriously in factories in the southeastern part of the city.

The city has developed a large amount of manufacturi which may be mentioned copper and brass works, iron foundr shops, textile works and knitting mills.

According to the 1900 census, Rome was twenty-fourth in cities of the State in population and was also twenty-fourth on the value of the manufactured products. It is not too that, with the increased opportunities brought by the barge will offer greater advantages to manufacturing and an increa prosperity may be confidentially expected within the next fe particularly on this account that the health conditions withi of especial interest and that studies for future sanitation a value.

For some years, namely, since 1893, the city has had a sys discharging partly into Wood creek and partly into the Moha proportion discharging into the former being about nine-tenth volume. The discharge into Wood creek has always produced a nuisance, although the waters of the creek are not used for poses until the sewage has passed through Oneida lake, but th complaints from the riparian owners along the stream and the the creek into a canal, now under way, has forced the city to matter of more efficient methods of sewage disposal. Plans for a of sewage disposal plant have been prepared, submitted to and the State Department of Health, and it is understood that the qu construction of the plant in the near future is practically ass

Vital Statistics

The average general death rate per 1,000 population in Rome, has been almost coincident with the average general death rate but the rate in Rome has rapidly increased in the last five yea shows the population, the number of deaths annually in the ci death rate per 1,000 for the twenty-one years, 1890–1910, inclusi be noted that the minimum death rate, 12.7, occurred in 1895 a average for the twenty-one years is 17.1. The highest rate is in 20, although the rate for 1890, 19.5, is nearly as high. In ord the meaning of this rate when compared with that of other cities tries, the following comparison may be made.

Figure 1 shows the general death rate of New York State fo twenty years as well as the death rate of Rome and the differen the two curves is plainly to be seen in that the curve for the Stat marked downward tendency throughout the twenty-one years, whi Rome has a marked minimum in 1895, since which time it has bee

Figure No. 1

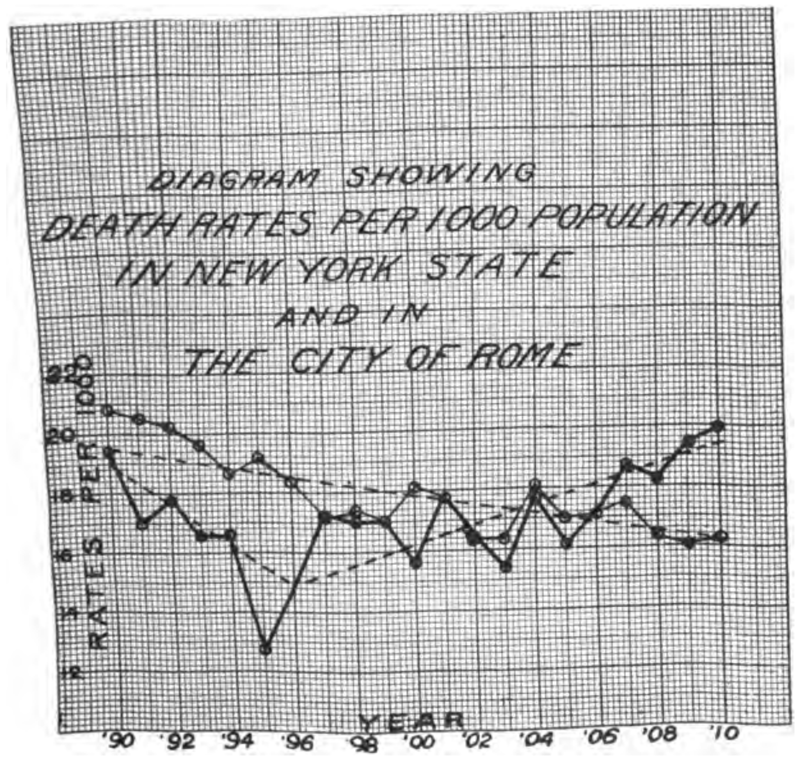


DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF ROME
RATES PER 1000
22
20
18
16
14
12
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

TABLE 1

Showing the Population, the Number of Deaths Annually and the Death Rate per 1,000 in the City of Rome for the Years 1890–1910 Inclusive

YEAR	Population	Number of deaths	Death rate per 1,000 population
1890	14,991	293	19.5
1891	14,314	242	16.9
1892	13,638	241	17.8
1893	13,851	228	16.5
1894	14,064	233	16.6
1895	14,277	182	12.7
1896	14,490	216	14.9
1897	14,713	255	17.3
1898	14,916	253	17.0
1899	15,129	258	17.0
1900	15,343	239	15.6
1901	15,586	277	17.8
1902	15,830	261	16.5
1903	16,074	248	15.4
1904	16,318	289	17.7
1905	16,562	286	16.1
1906	17,349	299	17.2
1907	18,136	340	18.7
1908	19,923	363	18.2
1909	19,710	382	19.4
1910	20,497	410	20.0

increasing. In the past four years the rate has been much higher than the average for the whole period and in 1910 the city had the unenviable record of being one of the group of six cities whose death rates were 20 or over. These cities and their death rates were: Lackawanna, 27.3; Troy, 20.8; Hudson, 20.7; Cohoes, 20.6; Saratoga, 20; and Rome, 20. The rate for the State, as a whole, in 1910 was 16.2, nearly four deaths per 1,000 fewer than Rome. The population of Rome in 1910 was about 20,000, so that with an increase of four deaths per 1,000 over the normal, eighty persons out of the population of Rome died, although, had the death rate been normal, they might still be living. This condition of things is not accidental, but is a matter of sanitation and health regulations and under average conditions there is no reason why the health authorities of Rome cannot reduce the rate to at least the normal for the State and cannot, in the future, save the lives of those who now die because of insufficient sanitary precautions. The death rate of the State in 1890 was 20.8, and, subject to minor variations it has steadily decreased until for the past three years it has been but little more than 16. It will be noted that in the case of the city of Rome there is no such downward tendency but rather, on the other hand, the curve is climbing upward at an alarming rate and this in spite of the fact that for the past four years the rate has been higher than that of the State.

The death rate in New York State, however, is relatively high when compared with other States, its rate being as high as second and never lower than fifth among the registration States. The following table, Table 2, shows the annual death rates of some of the States in the Union for the past nine years and it is plainly to be seen that the Rome rate, 17.1, which is apparently normal when compared with the rate for the State as a standard, is above the normal when compared with the average of other States for a standard. In Michigan, for example, the death rate for the last ten years has been below fourteen, and is, therefore, much lower than the death rate of Rome for the past twenty-one years, and 5 per 1,000 lower than that of Rome for the past six years. The death rate in Indiana has been between 12 and 13 for the average, and while it may be that some inaccuracies in the death rate of Indiana are due to imperfect registration and to the relatively large proportion of adult males in the population, yet the advantage of the sanitary con-

ditions under which the sparse population throug
and the hygienic surroundings of the citizens in
shown to a large extent in this reduced death ra

TABLE 2

Showing Number of Deaths per 1,000 *Populatio*
Registration Area

STATE	Annual average 1901 to 1905	DEATHS P		
		1904	1905	190
New York	17.1	18.0	17.0	17.
Maryland	......	......	......	15.7
Connecticut	16.0	15.9	16.5	16.7
Michigan	13.3	13.6	13.5	14.3
Indiana	13.0	13.5	12.8	12.5

Compared with other cities of the State, it has bee
that, in 1910, only four cities had larger death rates t
rate being at New Rochelle, the rate there being 11.8.
Rome, 17.1, is high when compared with the average
State which was 13.3 in 1909 and was 17.9 for all the c
the ten years, 1900 to 1909.

With respect to typhoid fever, sometimes called the fi
show conditions in Rome to be marked by extreme variabi
the number of deaths from typhoid fever in Rome since
the death rates per 100,000 population, and Figure 2 show

TABLE 3

Showing the Population, the Number of Deaths from Typ
Death Rate per 100,000 *Population in the City of R*

YEAR	Population	N of t typ fe
1890	14,991	
1891	14,314	
1892	13,638	
1893	13,851	
1894	14,064	
1895	14,277	
1896	14,490	
1897	14,713	
1898	14,916	
1899	15,129	
1900	15,343	
1901	15,586	
1902	15,830	
1903	16,074	
1904	16,318	
1905	16,562	
1906	17,349	
1907	18,136	
1908	19,923	
1909	19,710	
1910	20,497	

with corresponding rates for typhoid fever in the State througho
period. As with the general death rate, the characteristic of the
State is its downward tendency, particularly since 1891. In th

Figure No. 2

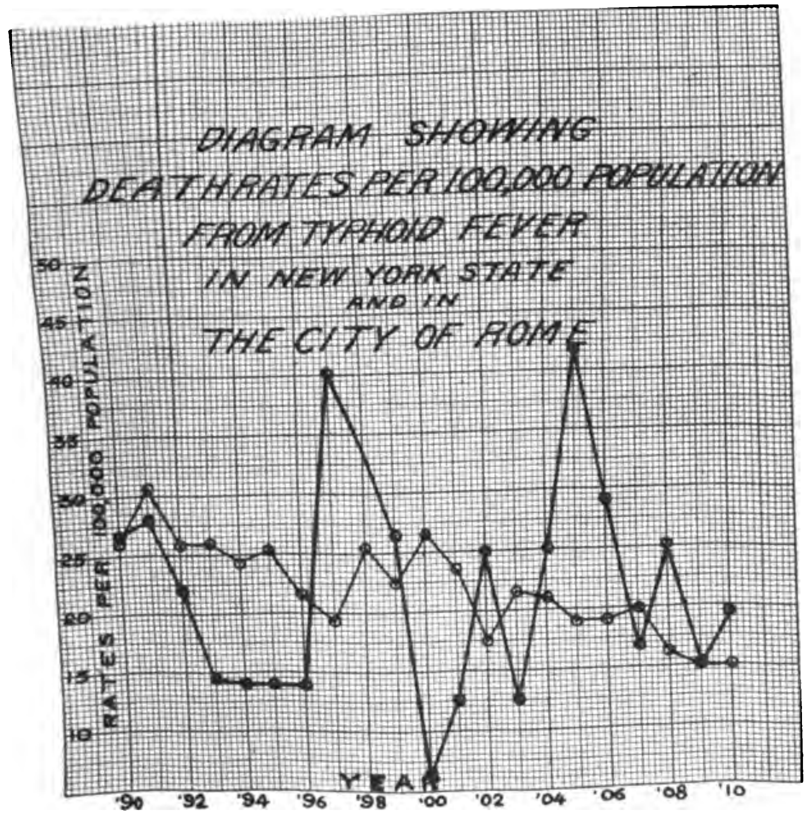


DIAGRAM SHOWING
DEATHRATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF ROME
RATES PER 100,000 POPULATION
50
45
40
35
30
25
20
15
10
YEAR
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

rate for the State was 30.5, and since that time it has greatly decreased, until, in 1909 and 1910, it has been 15.1, the lowest value ever reached. The corresponding rates in Rome show two years in which the rate was over 40 and the curve of Figure 2 is marked by the extreme variation. Out of the twenty-year period, half of the values shown in the table are below 30 per 100,000, and since 1906 the improvement is marked. In a small city the tabulation of statistics and the inferences to be drawn therefrom are not as conclusive as in larger cities since the addition or subtraction of a single death materially changes the conclusions which may be drawn from the statistics. Experience in cities and countries where sanitation is carefully considered, where the public water supply is above suspicion and where no well waters, the quality of which is at all in doubt, are used, shows that the typhoid fever death rate may be held as low as 10 per 100,000, and in no case should rise above 20 per 100,000. In eight years of the twenty, this condition has been violated, although only on two occasions was the excess sufficient to be especially alarming. In 1905 the rate was 42.3 or about 30 per 100,000 larger than is normal and desirable. For the population of Rome this means about five persons who succumbed that year to conditions which are generally believed to be under the control of the city authorities and the deaths may be justly charged to some insanitary conditions prevailing in the city at that time, whether these conditions be known or unknown. In that year also, since there are usually about eight persons ill of typhoid fever for each death, it is probable that there were some forty persons ill of the disease, unnecessarily.

The cause of typhoid fever has generally been found to be either polluted water or infected milk, and of late years much stress has been laid on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible, without further investigation, to say to which of these causes the large number of cases in Rome has been due and it must be left to the local health authorities to so examine the local conditions, the sanitary surroundings of the residences, the character of the milk distributed and the quality of the water supply as to be sure that they have taken every precaution to prevent a further recurrence of this disease.

Turning to the deaths of children under five years (see Table 4), the same variation and lack of downward tendency is to be noted. Under normal conditions the death rate of children under five years is about 50 per 100,000, a rate reached in Rome in no year of the 20-year period. Great variation, however, is shown from the fact that in 1901 the death rate was 16.8 and in 1895 was 14.7, whereas since 1906 the rate has been steadily increasing, reaching a value of 44.8 in 1910. The indications are that since children of tender age are especially susceptible to unhygienic conditions and respond most promptly to digestive disturbances caused by impure milk or polluted water, the variable death rate shows a lack of proper control and of uniform conditions. The actual significance of the rate itself cannot be ascertained without a correction based upon the number of children in the city as compared with the normal proportion of persons of various ages and also without a correction based upon the social conditions and the general care exercised over children in that particular city. Manifestly, if the number of children in a city is smaller than normal the number of deaths of children must also be small, irrespective of any living conditions. The variablity of the rate, however, is an indication of improper care in the homes of the children and must be remedied by more active work on the part of the sanitary authorities.

The inference to be drawn then from the statistical studies which we have made is that the tendency shown by the values of the death rate in consecutive years is alarming since it fails to indicate any response to the increasing efforts of the board of health and seems to indicate a neglect of those ordinary precautions which are becoming so generally adopted throughout the State as a whole. So far as could be learned the city has no conditions of drainage or of living which would account either for the

TABLE 4

Showing the Population, the Number of Death. Years and the Death Rate per 10,000 Popul 1890–1910

YEAR	Populat
1890	14,99
1891	14,31
1892	13,63
1893	13,851
1894	14,064
1895	14,277
1896	14,490
1897	14,713
1898	14,916
1899	15,129
1900	15,343
1901	15,586
1902	15,830
1903	16,074
1904	16,318
1905	16,562
1906	17,349
1907	18,136
1908	19,923
1909	19,710
1910	20,497

high rate itself or for the tendency to increase which h characteristic in the past few years. The typhoid fever r so excessive as to suggest that the excess rate from general caused by water supply since a polluted water is general typhoid fever rate rather than by the general death rate. however, that there must be present in Rome conditions w fered and are still interfering with the downward tenden rates exhibited through the State as a whole and that there in the city conditions which cause unaccountable and spor in all these rates. It is manifestly the duty of the health determine the cause of these variations and to take such steps them under control.

Water Supply

The waterworks of Rome date back to December, 1872, wh first led from the Mohawk river at Ridge Mills three miles n through a 14-inch cement main to the center of the city. Fro ning the water supply has been in the hands of the city offic history of the works has been one of constant development unde vision of a duly commissioned water committee. The first wate the Mohawk lasted the city nearly forty years, until the gro city and the constantly increasing demands for water made the of keeping the Ridge Mills reservoir filled with the original wat pump almost insurmountable. The flow of the Mohawk in its up is not large, and while there was in the river an abundance of furnishing the amount necessary for domestic consumption, there early as 1883, signs of lack of water for driving the pumping 1885 new pumps were installed with a capacity sufficient to me creasing demands of the city, and in 1892 a second main, 20-inch was laid from the reservoir to the city. But in 1896 the pressu city was so reduced that complaints were constantly made and the

the city for better conditions plainly shown. Then, too, the quality of the water was beginning to be seriously questioned. Rules and regulations for the protection from contamination of the water supply of the city of Rome were promulgated by the State Board of Health in 1893 but apparently were insufficiently enforced to adequately protect the quality of the water and in 1897 a large number of cases of typhoid fever developed. In 1904 an inspection of the watershed (20th Annual Report, State Department of Health, page 513) shows the presence on the watershed of a large number of polluting factors. Pig sties and manure piles were much in evidence. But the chief danger was in the sewage of Boonville which, during the canal season, emptied into the Black River canal, and, through overflows, into the Mohawk river above Ridge Mills. The canal boats also were grievous offenders, the wastes from the boats naturally going overboard and into the Rome water supply.

In 1896, after a careful consideration of the quantity of water needed, of its quality and cost, the engineers selected for the purpose by the city recommended that the supply from the Mohawk river by pumping be exchanged for a gravity supply from Fish creek, the intake being about thirteen miles from the center of Rome. Legal difficulties, however, deferred the construction of the works for more than ten years. Legislative authority had to be obtained to issue bonds for the purpose, the proposal had to be approved by popular vote, the necessary right of way and the water rights on Fish creek had to be acquired, questions which, with the inevitable condemnation proceedings, were all the subjects of long disputes, trials and revisions by the higher courts. An amendment to the State Constitution was ultimately found necessary before the work of construction could legally be taken up. But in 1907 all legal difficulties had been surmounted, the voice of the people had indicated by an overwhelming vote (413 to 17) their desire for the immediate construction and bids were called for in the fall of the year. On January 10, 1910, water was turned into the distribution mains, so that for the past two years Rome has had the advantages coming from an unlimited amount of pure, soft water.

Fish creek, the source of the present water supply, empties into Oneida lake, combining with Wood creek about a mile from the lake. At a point about seven miles northeast of the lake it divides into two branches, one extending almost north and south, passing through the small hamlet of Taberg, and the other extending northwest through the village of Camden. The latter is the larger of the two and drains a wild and wooded country well watered and containing a number of small lakes. The eastern branch, however, is the source of the Rome water supply, the drainage area being about 115 square miles and the minimum flow of the stream at Taberg being about 0.15 cubic feet per second at the time of the minimum summer flow. The present population of Rome is about 20,000 and with a maximum consumption per head per day of 200 gallons the amount of water required from the stream would be a little over 6 cubic feet per second, or only about one-third of the capacity of the stream even at dryest times.

The watershed is partly wooded, most of the area, however, being cleared land from which the population has largely gone. On each side of the stream and about half a mile distant therefrom is a road with gently sloping fields reaching to the precipitous bank of the stream itself. Along the road are old and small farmhouses, from half a mile to a mile apart, while next to the main body of the stream, except in a very few places, no houses are to be found. There are two small collections of houses on the watershed, one at Point Rock and the other at Swansett Mills, the latter being at least ten miles above the diverting dam and intake. In order to protect the quality of the water and to minimize the effect of the dwellings which are located on the roads above mentioned, the water commissioners of the city have made frequent inspections, have issued instructions to the property owners in the matter of remedying certain ob-

vious conditions tending toward the pollution of the str
certain properties which could not otherwise be adequa
in general, have indicated their desire to take advan
qualities of the water by eliminating, so far as pos
sources of pollution.

On July 17 directly after an inspection of the wat
days, the writer listed and reported to the Departm
properties which needed immediate attention because of
pigpens, manure piles, cesspools and privies and which l
time, heeded the requests and orders of the city water l
were at once referred to the water company for proper
the rules and regulations enacted by the State Departm

With continued and intelligent supervision of the water
continued disposition of water board to improve conditi
the quality of the water, there would seem to be no reas
from this area should not be in every way entirely sati
quality is concerned. It is possible that at times the co
because of the presence of certain swamps on the waters
ject to criticism, but such color is not dangerous to hea
of its removal is probably not proportional to the benefi
therefrom.

The diverting dam in the creek is built in a gorge abou
deep, the dam diverting a certain amount of water into a
more than a mile long. This tunnel and the aqueduct leadir
distributing reservoir at Stokes, about six miles long, ha
more than 20,000,000 gallons a day, four or five times the
for water. The aqueduct is of concrete thirty-six inches i
laid on the hydraulic grade throughout. Provisions have b
future storage reservoir at the upper end of this aqueduct.
lower end of the tunnel, by the purchase of a large area at a
tion and location. The distributing reservoir at Stokes
15,000,000 gallons, has a concrete floor and earth side walls
cores. The inner slope walls are paved with concrete paving
water line and the side walls everywhere extend well above th
ground so that there is no danger of contamination from the
in the immediate vicinity. The iron pipe line from the res
outskirts of the city, about seven miles in length, is thi
diameter and the distribution is practically that of the old
pressure at the center of the city is about eighty pounds to the
this being somewhat reduced in some quarters because of th
size of the laterals.

Table 5 gives the results of analyses of the city water sin
creek supply was introduced, the analyses being made by the St
Laboratory on the dates indicated. Only two complete analyse
but the bacteriological analyses indicate in part the character o

Table 6 shows in a condensed way the bacteriological results
from the chemical and it will be noted that while occasional
teriological count is high, as on June 29, 1910, yet, in general,
of bacteria does not exceed 200 and is therefore to be taken as
a satisfactory surface water. The presence of fecal bacteria is
erally to be found. Occasionally in large samples of water baci
type may be isolated as on May 11 and on June 29, but in view o
that the open land is largely used for pasturing it may be taken fo
that it is to this fact that the presence of these organisms is large
wholly due.

TABLE 5

Report of Water Analyses of the City of Rome

Collected on	2/9/10	2/9/10	5/10/10	5/10/10	5/10/10
Collected from	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Color	....	....	....	....	....
Odor, hot	....	....	....	....	....
Odor, cold	....	....	....	....	....
Turbidity	....	....	....	....	....
Solids, total	....	....	....	....	....
Loss on ignition	....	....	....	....	....
Mineral residue	....	....	....	....	....
Nitrogen as:					
Ammonia free	....	....	....	....	....
Ammonia albuminoid	....	....	....	....	....
Nitrites	....	....	....	....	....
Nitrates	....	....	....	....	....
Oxygen consumed	....	....	....	....	....
Chlorine	....	....	....	....	....
Hardness, total	....	....	....	....	....
Alkalinity	....	....	....	....	....
Bacteria per c.c.	600	1,200	180	170	50
B. coli communis	Not present	Not present	Not present	Present	Present

Collected on	6/28/10	6/28/10	8/26/10	8/26/10	10/26/10
Collected from	Reservoir, public supply	Intake, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Color	....	....	....	....	5
Odor, hot	....	....	....	....	2 veg.
Odor, cold	....	....	....	....	1 veg.
Turbidity	....	....	....	....	5.
Solids, total	....	....	....	....	71.
Loss on ignition	....	....	....	....	23.
Mineral residue	....	....	....	....	48.
Nitrogen as:					
Ammonia free	....	....	....	....	.012
Ammonia albuminoid	....	....	....	....	.100
Nitrites	....	....	....	....	.001
Nitrates	....	....	....	....	0.06
Oxygen consumed	....	....	....	....	7.40
Chlorine	....	....	....	....	0.375
Hardness, total	....	....	....	....	45.7
Alkalinity	....	....	....	....	42.
Bacteria per c.c.	2,000	2,000	600	230	160
B. coli communis	Present	Present	Present	Present	Present

Collected on	11/12/10	11/12/10	12/21/10	3/6/11	3/6/11
Collected from	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply	Tap, public supply
Color	....	....	Trace	....	....
Odor, hot	....	....	1 veg.	....	....
Odor, cold	....	....	1 veg.	....	....
Turbidity	....	....	Clear	....	....
Solids, total	....	....	55.	....	....
Loss on ignition	....	....	20.	....	....
Mineral residue	....	....	35.	....	....
Nitrogen as:					
Ammonia free	....	....	.008	....	....
Ammonia albuminoid	....	....	.036	....	....
Nitrites	....	....	.001	....	....
Nitrates	....	....	0.50	....	....
Oxygen consumed	....	....	3.75	....	....
Chlorine	....	....	0.50	....	....
Hardness, total	....	....	35.1	....	....
Alkalinity	....	....	34.	....	....
Bacteria per c.c.	230	400	170	200	230
B. coli communis	Present	Present	Present	Present	Present

TABLE 5 — *Concluded*

Report of Water Analyses of the City of Rome —

Collected on	3/6/11	3/6/11	
Collected from	Tap, public supply	Tap, public supply	T
Color	....	....	
Odor, hot	....	....	
Odor, cold	....	....	
Turbidity	....	....	
Solids, total	....	....	
Loss on ignition	....	....	
Mineral residue	....	....	
Nitrogen as:			
Ammonia free	....	....	
Ammonia albuminoid	....	....	
Nitrites	....	....	
Nitrates	....	....	
Oxygen consumed	....	....	
Chlorine	....	....	
Hardness, total	....	....	
Alkalinity	....	....	
Bacteria per c.c.	300	425	2
B. coli communis	....	....	

TABLE 6

Showing the Results of the Determination of the Number of B
Presence of B. Coli Type in Rome City Water on the Dat

DATE	Numb of bact per c.
2/ 9/10	8
2/ 9/10	1,2
5/10/10	1
5/10/10	1
5/10/10	
6/28/10	2,0
6/28/10	2,6
8/26/10	6
8/26/10	23
10/26/10	16
11/12/10	2
11/12/10	40
12/21/10	17
3/ 6/11	20
3/ 6/11	23
3/ 6/11	300
3/ 6/11	425
5/24/11	200
7/ 8/11	1,600

The chemical analysis of October 27, 1910, of December 23, 1
25, 1911, and of July 8, 1911, all show a water of about the same
is notably soft, contains a moderate amount of undecomposed o
ter, indicated by the relatively large amount of albuminoid ammo
the presence of nitrates. The chlorine is low in every case and
position processes were not active. One must conclude, from a st
analyses and of the character of the watershed, that, except for so
seen accident and unexpected individual pollution, the water is of
value for domestic purposes and should have the effect of lowerin
general death rate and the death rate from specific intestinal disea

Conclusions

1. The general death rate of Rome was lower than that of the St
1906 but since that time it has been higher. For the past ten years
has shown a marked upward tendency, in contradistinction to the
State where a downward tendency is plainly shown.

2. The typhoid fever death rate has been extremely variable, with two marked peaks in 1897 and 1905. The recent introduction of an improved water supply may result both in lowering this death rate and in preventing the variations so conspicuous in the past.

3. The water supply comes from the east branch of Fish creek and is subject to a very small amount of surface contamination. The watershed is very sparsely inhabited, is partly wooded and forms an unusually good gathering ground.

4. The chemical and bacteriological analyses both show a good quality of surface water. There is present occasionally a considerable amount of undecomposed organic matter, most of which is of vegetable origin and to be accounted for by the presence of swamps on the watershed. Occasionally also, the presence of fecal organisms can be detected in the larger samples of water, indicating that pollution of either animal or human origin finds access to the water. The number of bacteria present is generally low and the water in general is shown by analyses to be in good sanitary condition.

Recommendations

1. In view of the high death rate, it is recommended that careful studies be made by the local health authorities of the vital statistics of the city, with a view of ascertaining, if possible, the particular disease or diseases most prevalent and in excess of the normal and that steps be taken to reduce the number of deaths from such diseases by the introduction of the proper sanitary precautions.

2. In view of the analyses which show the occasional presence of fecal organisms, it is recommended that frequent inspections be made of the watershed and that as rapidly as possible all barns, pig pens, privies and other outhouses so located as to in any way drain into or otherwise affect injuriously the quality of the water, be purchased and removed or otherwise treated so as to eliminate all possible danger from them.

Respectfully submitted,

HENRY N. OGDEN,

Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the board of water and sewer commissioners and to the other city authorities, urging that the recommendations contained in the report be carried out.

TONAWANDA

ALBANY, N. Y., *June* 29, 1912.

MR. THEODORE HORTON, *Chief Engineer, State Department of Health, Albany, N. Y.:*

DEAR SIR: — I have the honor to hand you herewith a report on the sanitary conditions of the city of Tonawanda, particularly as affected by the quality of the water supply. The visit to Tonawanda on which this report is based was made in August, 1911, and the studies of statistics have been made and the report written during the month of June, 1912.

The city of Tonawanda is situated on the east bank of the Niagara river, about half way between Buffalo and Niagara Falls. Two creeks, Ellicott creek and Tonawanda creek, flowing westerly into the Niagara river join within the limits of the city, the more northern one, Tonawanda creek, forming the boundary between the cities of Tonawanda and North Tonawanda. The population of Tonawanda, according to the 1910 census, was 8,290, having increased only 270 in the preceding decade. It was incorporated as a village in 1880 and owed its importance to the fact that the Erie canal appropriated the Tonawanda creek at Pendleton, about nine miles east and entered the Niagara river at this point, making Tonawanda the natural location for extensive shipyards and factories. The growth of the village for a time was rapid

but its importance has diminished and of late years but be noted. Since the development of Niagara Falls water mission of electric power has stimulated industry in Ton are now rolling mills, planing mills and manufactures of and paper. In the early days, both the cities of Tonawanda wanda were noted for the large lumber yards but since the off, this business has fallen into decay.

The New York Central Railroad and the Erie Railroad and Niagara Falls pass through the city and branch lines Central from Lockport and Batavia connect in the city.

The topography of the city shows no marked features. but little above the level of the river — so low, in fact, tha combined with strong westerly winds are frequent causes the Niagara river. The creeks also are subject to high wate do considerable damage. A complete system of storm water installed and the discharge is into the creeks and river, as

According to the 1900 census, Tonawanda ranked fiftie among the cities of the State and fifty-ninth in the value products. It is more than likely, however, that this sta changed by the 1910 census, in view of the increasing utiliz Falls power. The population in 1900 was one-fourth foreig can be little doubt of the large proportion of foreigners at t The appearance of certain streets of the city and certain standards of living and conditions of housing which are char tain types of European-born residents and such conditions least, account for the high death rates to be observed, especi dren.

Vital Statistics

The general death rate of the city for the past twenty-tw average value of 14.6, a rate which compares favorably with State. Thus, the death rate for the State as a whole in 191 for the ten-year period, 1900 to 1909, was 16.9. Table 1 gi

TABLE 1

Showing the Population, the Number of Deaths Annually and per 1,000 in the City of Tonawanda for the Years 1890–19

YEAR	Population	Numb of deat
1890	7,075	1
1891	7,110	1
1892	7,145	1
1893	7,179	1
1894	7,213	1
1895	7,247	1
1896	7,281	1
1897	7,316	1
1898	7,351	1
1899	7,386	8
1900	7,421	8
1901	7,517	10
1902	7,613	11
1903	7,710	9
1904	7,807	8
1905	7,904	9
1906	7,981	8
1907	8,058	10
1908	8,135	10
1909	8,212	10
1910	8,290	106
1911	8,368	102
Average		

Figure No. 1

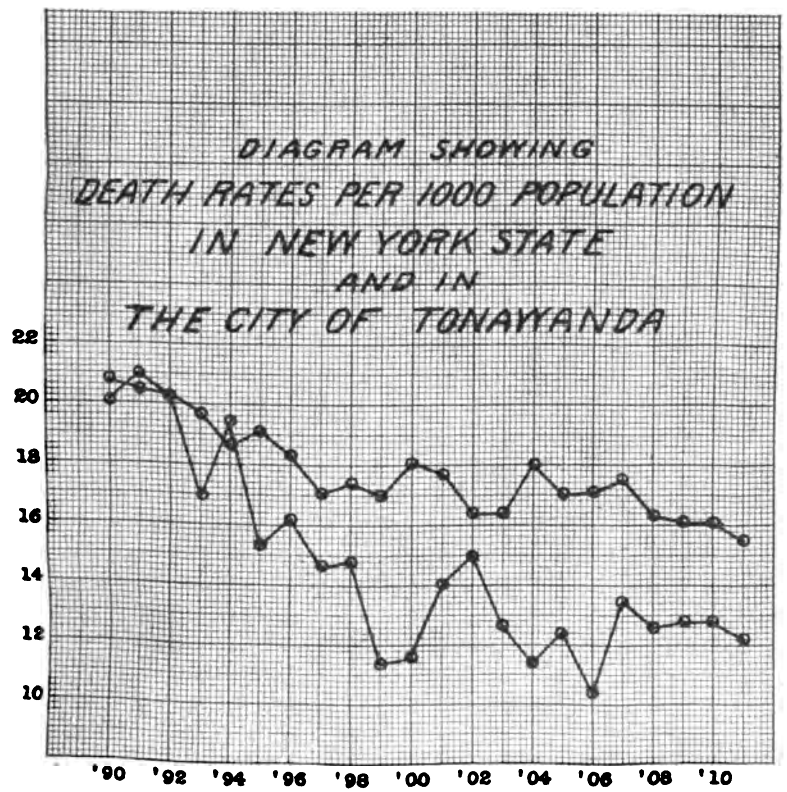


DIAGRAM SHOWING
DEATH RATES PER 1000 POPULATION
IN NEW YORK STATE
AND IN
THE CITY OF TONAWANDA
22
20
18
16
14
12
10
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

tion, the number of deaths and the death rates per 1,000 population in Tonawanda for the period 1890 to 1911, inclusive, and Figure 1 shows the rates plotted graphically with similar rates for the State as a whole for comparison. The striking feature of the rates for Tonawanda is the gradual decrease since the beginning of this period and Table 2 shows the rate by five-year periods from 1890 to 1909 and indicates plainly this downward tendency. Thus, in the first five-year period the rate was 19.6 and in the last 12.3, a striking decrease and one similar in tendency and of even greater magnitude than the corresponding decrease shown by the State rates.

TABLE 2

Showing the Death Rates by Five-Year Periods in the City of Tonawanda for the Years 1890 to 1909 Inclusive

FIVE-YEAR PERIOD	Death rate per 1,000 population
1890–1894	19.6
1895–1899	14.5
1900–1904	12.9
1905–1909	12.3

It should be noted, however, that some of the rates are so low, as for instance in 1899, 1900, 1904 and 1906, as to suggest that the registration of deaths is not complete and that the apparent healthfulness of the city is only apparent and due to lack of accurate registration. Professor Willcox, Statistical Expert for the United States Census Bureau, declares that, whenever, in any city, the death rate goes below 12, the accuracy of the statistics must be questioned. He quotes Dr. Billings, referring to the death rate in Buffalo, on this point as follows: "The probabilities are at least fifty to one that the death rate has not been below 15 per 1,000 per annum." Mr. Willcox himself says, referring to the death rate of 13 per 1,000 in Ithaca: "To one knowing nothing about vital statistics this death rate which was one of the lowest in the State, proved that Ithaca was a remarkably healthy town, but to one having any knowledge of the subject and of the probabilities in the case, this figure was so low as to be incredible and to put one on inquiry as to its accuracy. Investigation showed that in about half the cases of deaths in Ithaca, the law (requiring registration) was violated and that in about one-quarter of them no record of the deaths was ever made or reported to Albany." The true death rate of Ithaca was shown to be not below 16.5 per 1,000, instead of the 13.4, which was claimed. In the light of such criticism of two such authorities, death rates in Tonawanda of 10.4 and 11.4 must at least suggest the possibility of inadequate registration.

So far as the inspector could note, there were in Tonawanda no natural conditions so superior to those existing in other parts of the State as to suggest healthful conditions so manifest. The older portion of the city near the river is crowded and somewhat congested. There is a large proportion of the population of the working class whose knowledge of sanitation must be assumed to be of a low order and it is hard to believe that under such conditions a low death rate can be steadily maintained year after year.

TABLE 3

Showing the Population, the Number of Deaths from Typhoid Fever and the Death Rate per 100,000 *Population in the City of Tonawanda for the Years* 1890 *to* 1911 *Inclusive*

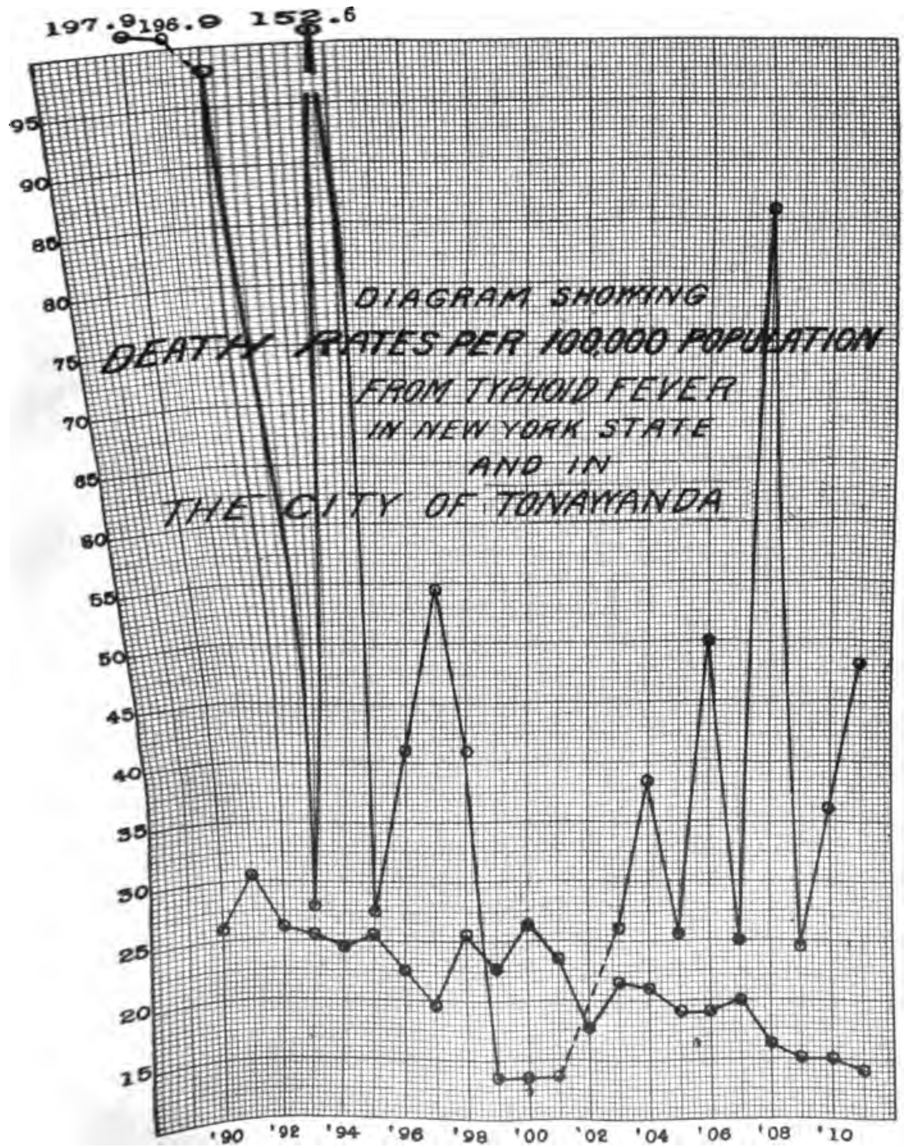
YEAR	Population	Number of deaths from typhoid fever	Death rate per 100,000 population
1890	7,075	14	197.9
1891	7,110	14	196.9
1892	7,145	7	98.0
1893	7,179	2	27.9
1894	7,213	11	152.5
1895	7,247	2	27.6
1896	7,281	3	41.2
1897	7,316	4	54.7
1898	7,351	3	40.8
1899	7,386	1	13.5
1900	7,421	1	13.5
1901	7,517	1	13.3
1902	7,613	....	....
1903	7,710	2	25.9
1904	7,807	3	38.4
1905	7,904	2	25.3
1906	7,981	4	50.1
1907	8,058	2	24.8
1908	8,135	7	86.0
1909	8,212	2	24.4
1910	8,290	3	36.2
1911	8,368	4	47.8
Average			56.2

In respect to typhoid fever, Tonawanda has a record far from enviable. Table 3 shows the population of the city, the deaths from typhoid fever and the death rates per 100,000 population for the past twenty-two years and Figure 2 shows these rates plotted together with similar rates for New York State. It will be noted that there have been conspicuous epidemics in the city, as in 1890, 1891 and 1894. Since 1894, the only year of marked excess has been in 1908 and in many years the typhoid rate has been as low as the rates of the State and not higher than the reasonable limit. The average for the twenty-two year period of Tonawanda is 56.2, but if the years 1890 and 1891 be omitted, the rate drops to 38.3. In 1902 no deaths were reported and for the three years preceding that one death each is recorded.

It has been found by experience and statistics that it is quite possible, in cities where proper supervision is exercised over the quality of the water and milk supplies in the northern part of the United States, to maintain a typhoid fever death rate below 20 and it is not unreasonable to expect that rate to be reduced one-half as sanitary progress gains further headway. The average rate, then, for Tonawanda is at least three times what it should be and if the city is to have its reputation for healthfulness maintained, it must ascertain the cause of the unusual number of typhoid fever deaths and take steps to remove the conditions responsible for them. Considering the number of deaths and the size of the city, one death from typhoid fever should be a maximum number and any number of deaths greater than this should be cause for alarm and for greater activity on the part of the local board of health.

Considering only the last fifteen years, that is, since 1896, there have been eleven years when the number of deaths in Tonawanda was more than one, and in 1909 there were seven, that is, six more than is a reasonable number for a city of the size of Tonawanda. In these last fifteen years, there have been twenty-five deaths more than should have occurred, deaths which are due, in the light of modern sanitation, to causes entirely under the control

Figure No. 2


197.9
196.9
152.6
DIAGRAM SHOWING
DEATH RATES PER 100,000 POPULATION
FROM TYPHOID FEVER
IN NEW YORK STATE
AND IN
THE CITY OF TONAWANDA
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
'90
'92
'94
'96
'98
'00
'02
'04
'06
'08
'10

of local health authorities and such deaths must be considered as a reflection both upon the activity of the health authorities and on the intelligence of the community as a whole.

Since one death is generally accompanied by about ten cases of illness not fatal, it means that if by a proper institution of health measures the number of deaths from typhoid fever had been held down to one each year, then in the last fifteen years twenty-five deaths and about two hundred fifty cases of illness from typhoid fever would have been prevented. If the usual value of human life is taken at $5,000, according to the evidence of statistical experts, then the direct loss to the city from these twenty-five deaths has been $125,000, and, considering the loss from the accompanying cases of illness, the total loss to the city must have been not far from a quarter of a million dollars. From the money standpoint alone, there is good reason for believing that it would be worth while for the city of Tonawanda to take some cognizance of the presence of typhoid fever in the city, for its health board to indicate its interest in the problem, for the city officials to provide the necessary funds for studying the problem and for the residents as a whole to demand that such a study be made.

In a small city the tabulation of statistics and the inference to be drawn therefrom are not as conclusive as in larger cities, since the addition or subtraction of a single death may change materially the conclusion which may be drawn from the statistics. But in the case of Tonawanda, the repetition of three or four deaths from this disease each year would seem to show that it is not accidental but that the high rate is due to local conditions which should be investigated. In the State as a whole, the efforts of the sanitary authorities and the greater appreciation of sanitary truths is shown by the gradual reduction in the typhoid fever death rate. In 1891 this rate was 30.3 and in 1911 it was 14.7, a reduction of more than one-half, which has been accomplished gradually year by year. The curve for the State in Figure 2 shows this marked downward tendency. In Tonawanda, however, there is no such tendency and the increase in the number of deaths since 1908 is an indication that the forces at work and responsible for the prevalence of this disease are not yet brought under sanitary control.

The cause of typhoid fever has generally been found to be either polluted water or infected milk. Recently, also, much stress has been laid, particularly in the southern States, on the possible transmission of the disease by flies from infected material in drains or privies or polluted streams. It is not possible, without further investigation, to say to which of these causes the occasionally large number of deaths and presumably the many accompanying cases of typhoid fever in Tonawanda have been due and it must be left to the local health authorities to so examine the existing conditions, the sanitary surroundings of the residences, the character of the milk distributed, and the quality of the water supply, as to be sure that they have taken every precaution to prevent a further recurrence of an excessive amount of this disease, and, if possible, to reduce the amount now existing.

The use of well water in a community where the subsoil has been for a long time the receptacle of human wastes is another potent cause of typhoid fever and the fact that river water is available in many of the mills and factories suggests the possibility of river water being ignorantly or carelessly used in such a way as to afford entrance for the typhoid germ into the human system. It is possible, also, that connections exist between the sprinkler system of the factories using river water supplied by pressure pumps on the one side and the city mains on the other. In other cities it has been found that where such conditions as these exist, the back pressure valves on the city water pipes are not tight, so that when the fire pumps are turned over and the pressure raised in the sprinkling system above that in the city mains, some of the river water passes into the mains carrying with it seeds of disease.

Turning to the death of children under five (see Table 4), it may be seen that while the average death rate at that age per 10,000 population is 44.3, there has been a wide variation from that average in the several years. It is a matter of congratulation that the rate is apparently decreasing, since

TABLE 4

Showing the Population, the Number of Deaths of Child
and the Death Rate per 10.000 *Population in the C*
the Years 1890 *to* 1911 *Inclusive*

YEAR	Population
1890	7,07
1891	7,11
1892	7,1
1893	7,1
1894	7,2
1895	7,2
1896	7,
1897	7,
1898	7,
1899	7,
1900	7,
1901	7
1902	7
1903	7
1904	7
1905	7
1906	
1907	
1908	
1909	
1910	
1911	
Average	

in the first seven years of the period the rate w
since 1897 that value has not been reached in a
the United States and also in Massachusetts a
from 50 per 10,000, so that the Tonawanda rate
mal, and if the first seven years of this rate be
This rate, however, based as it is upon the p
method of estimating the significance of the
years, since the number of children of that
communities. In 1911 the birth rate in Ton
birth rate for other cities of the State was 24.
dren in Tonawanda less than the normal.
marked, the birth rate being 20.1 for Tonaw
If a correction were made to the death rate
that the number of children is less than the
tables would be materially increased. Thus,
is about 35, the deaths of children under 5 y
46 per cent. of all the deaths while in Fra
the deaths of children were only 23 per cen
birth rate was 20.1 and the percentage of d
was 19.8, and in 1911, the birth rate being
children under five to total deaths was 27.4

In the last six years in New York State
total deaths has ranged between 27.3 and
one-fourth of all the deaths were under fi
total number of deaths, the number of deat
of the latter to the former in Tonawanda fo
significant since a high death rate among
of the sanitary condition of a city. The tab
the percentage in that year being five grea
three other years, the rate is also excessive
so far below the normal as to suggest imp
In 1907, for example, the percentage of chi

16.5, a most curious and unusual condition. It is worth noting, also, that in 1911 the percentage reached the normal of the State, due, perhaps, partly to better registration, but if in the last three years the percentage has actually increased from 18.1 to 27.4, there is a fearful increase in the deaths of children, amounting almost to a calamity and producing a condition which should be taken in hand at once by the local health authorities.

TABLE 5.

Showing the Total Number of Deaths, the Number of Deaths Under Five and the Percentage of the Latter to the Former in Tonawanda for the Years 1901 *to* 1911 *Inclusive*

YEAR	Total deaths	Deaths under five	Percentage
1901	106	29	27.3
1902	114	32	28.1
1903	97	30	30.9
1904	82	22	24.7
1905	96	36	32.6
1906	83	24	24.7
1907	109	18	16.5
1908	103	24	23.3
1909	105	19	18.1
1910	106	21	19.8
1911	102	28	27.4

One of the greatest casual factors in infant mortality is that group of disorders classified as diarrhea and enteritis. In the registration area of the United States in 1910 28 per cent. of the children under one year are recorded as having died of these diseases. About 25 per cent. of all the deaths in this group occurs in children under two years of age and it is generally conceded that certain etiological factors not bacterial in nature are largely responsible for the prevalence of these infant diseases. Thus, the influence of climate upon enteritis is acknowledged since cholera infantum is well understood to be a summer disease. The racial characteristics of the negro population and of certain classes of immigrants seem to affect the death rate also. But perhaps the most important factor in the prevalence of enteritis is the well known influence of the slums of the large cities and of the results of women labor in mill and factory towns. A large part is also due to milk and water impurities, and if one could eliminate the enteritis due to water and milk we should have in the death rate from that disease a very fair index of any city's sanitary condition. Certainly a city which is too small to have slums and which, in spite of a good water supply, has a high enteritis rate, has, in all probability, insanitary conditions which are not essentially different from the slums of the large cities, at least in their effect upon infant mortality.

Table 6 shows the death rate from enteritis under two years in Tonawanda for the past five years.

TABLE 6

Showing the Population, the Number of Deaths from Enteritis Under Two Years and the Death Rate per 100,000 *in Tonawanda*

YEAR	Population	Deaths from enteritis under two years	Rate per 100,000
1907	8,058	1	12.4
1908	8,135	6	73.8
1909	8,212	3	38.5
1910	8,390	5	60.5
1911	8,368	3	35.9

For comparison the following table from a bulletin of the United States Public Health and Marine Hospital Service, written by Mr. A. J. McLoughlin, gives the death rates from typhoid fever and from enteritis in the Michigan cities with notes as to the water supply. The three cities at the end of the list, Pontiac, Ann Arbor and Manistee, which have a good water supply, have low rates from both typhoid fever and enteritis; also Lansing, Kalamazoo and Jackson are marked as having good water supplies, although the death rates would indicate either a questionable quality of water or of some other insanitary conditions.

Comparing the death rates of enteritis in Tonawanda with the rates shown in Table 7 in the several Michigan cities, it is apparent that the conditions in Tonawanda are such that a uniform and stable rate is not obtained. Thus, in 1908 and 1910 the Tonawanda values are so high as to indicate a polluted water without very much doubt, but in 1909 and 1911, particularly in view of the low percentage of deaths under five to total deaths, the inference to be drawn is that conditions in those years were satisfactory from the standpoint of public health. Unfortunately time did not permit the inspector to remain in Tonawanda long enough to follow up the indications here suggested and to determine, if possible, the local conditions resulting in the high rates of 1908 and 1910, or of the high percentage of infant deaths to total deaths in 1902, 1903 and 1905. It will be necessary for the local authorities to consider the locality of each specific death and to determine, if possible, the cause of such death. Thus, by comparison of conditions in 1905 with 1907, which latter year seems to have been unusually healthful from every standpoint, it may be possible to take such steps as shall prevent any further excess in the deaths of children, so significant a factor in the estimation of the sanitary condition of a city.

TABLE 7

Showing the Average Death Rates per 100,000 *from Typhoid Fever and Enteritis in Michigan Cities, with Notes as to the Water Supply,* 1905–1910

CITIES	Typhoid fever	Enteritis	Water supply
Escanaba	136.0	185.0	Polluted
Sault Ste. Marie	52.3	134.6	Good
Alpena	46.7	162.6	Polluted
Ironwood	43.5	124.5	Doubtful
Port Huron	42.0	78.6	Polluted
Flint	43.0	63.0	Polluted
Traverse City	42.0	53.5	Polluted
Bay City	37.3	56.3	Polluted
Lansing	33.3	56.6	Good
Battle Creek	31.3	44.0	Doubtful
Kalamasoo	29.5	59.0	Good
Jackson	28.3	45.5	Good
Muskegon	24.7	59.8	Doubtful
Saginaw	24.6	42.0	Wells safe; river polluted
Pontiac	24.5	44.0	Good
Ann Arbor	22.1	18.6	Good
Manistee	20.8	48.0	Good

So far as could be learned the city has no conditions of drainage or of living which would by superficial examination account for the remarkable variations of the typhoid fever death rate or for the occasionally high death rate among children. It would seem, however, that there must be present in Tonawanda conditions which are able to affect markedly both of these rates, which conditions are not under the control of the sanitary authorities and which are responsible for the unfortunate conditions which have been

pointed out. It is manifestly the duty of the health authorities to determine the cause of these variations and to take such steps as shall bring them under control.

Water Supply

The water supply of Tonawanda is obtained from the Niagara river the construction of the system having been inaugurated in 1892. Direct pumping on the Holly system is employed, and in 1903 the rate was about four and one-half million gallons a day, an excessive amount for a population of 8,000 people, even assuming a large amount used for manufacturing. The distribution is thoroughly carried out, practically all of the residents being users of the river water. The intake pipe extends 1,800 feet out from shore and is very nearly in the center of the stream. The intake is at the bottom of the river and the water flows by gravity to the pump well. The sewage of Buffalo, eleven miles upstream, is discharged into the river and is carried by the stream past the city. Buffalo has a population of 433,000 and discharges about 150,000,000 gallons of domestic sewage per day. The typhoid fever death rate in Buffalo is always above 20 per 100,000, and in 1894 was 63 and in 1902 and 1903 above 30. It is believed (and experiments which have been made indicate the fact) that the sewage of Buffalo, after discharge into the river, follows generally the eastern shore and does not extend far into the thread or main portion of the current. On the other hand, the quality of the Buffalo drinking water, which comes from the main thread of the Niagara river and which at times shows pollution by fecal organisms, indicates that the main stream itself is polluted, probably largely if not wholly by Buffalo sewage.

The typhoid fever statistics, which from 1890 to 1894, with one exception, had rates of 98 or more, constituting a continuous epidemic, show plainly a polluted condition of the public water supply. Why the rates from 1899 to 1901 should be so low with the continued use of the same water supply is not apparent, but the records since 1903 show such repeated high rates as to make the pollution of the river and its unfitness for domestic use certain.

The analyses (see Table 6) confirm the impression which the natural topographic features give as to the character of the water. Thus, the albuminoid ammonia is high at certain seasons, although comparing favorably in amount with waters of good quality at other times. Thus, on March 6, 1909, on May 17, 1909, on October 11, 1910, and on December 17, 1910, the albuminoid ammonia was about one-tenth part per million, a high value for a good surface water supply. So, also, the nitrates are variable in quantity, at times presumably with the large stream flows in reduced amounts and at other times with high values. The bacterial count is generally high, although during this past winter the numbers have been low, but a surface water containing 33,000 or 34,000 bacteria per c. c. should be condemned for drinking purposes. So also bacteria of the B. coli type are always present in 10 c. c. and usually in 1 c. c. samples, and the fact that they are always about in 1/10 c. c. samples merely shows that the dilution in the river is great enough so that in that amount (about three drops) they were not found by the analyst. The evidence, then, from all sides goes to show that the water supply is bad and that it is probably responsible for the high typhoid fever death rates and also for the erratic and at times marked excess in the deaths of children.

TABLE 8

Report of Water Analyses of the City

Source	Tap, public supply	Tap, public supply
Collected on	3/ 6/09	5/17/09
Color	Trace	Trace
Turbidity	10.	40.
Total solids	252.	258.
Loss on ignition	140.	146.
Mineral residue	112.	112.
Nitrogen as:		
Free ammonia	.024	.012
Albuminoid ammonia	.100	.146
Nitrites	.001	.003
Nitrates	0.04	0.20
Oxygen consumed	1.75	2.80
Chlorine	6.50	7.25
Total hardness	91.4	81.4
Alkalinity	91.5	79.
Bacteria per c.c	225.	1,200.
B. coli type:		
10 c.c	Present	Presen
1 c.c	Absent	Presen
1/10 c	Absent	Absen

Source	Tap, public supply	Tap, pul supply
Collected on	12/17/10	2/ 2/
Color	5.	10.
Turbidity	25.	10.
Total solids	290.	164.
Loss on ignition	165.	60.
Mineral residue	125.	104.
Nitrogen as:		
Free ammonia	.008	[illegible]
Albuminoid ammonia	.092	[illegible]
Nitrites	.002	[illegible]
Nitrates	0.04	0.[illegible]
Oxygen consumed	1.80	2.[illegible]
Chlorine	6.25	7[illegible]
Total hardness	120.	102.
Alkalinity	100.	100.
Bacteria per c.c	500.	475.
B. coli type:		
10 c.c	Present	Pres
1 c.c	Present	Pres
1/10 c.c	Absent	Abs

Source	Tap, public supply	Tap, public supply	Tap, p supp
Collected on	9/20/11	10/31/11	12/
Color	5.	10.	10
Turbidity	5.	25.	20
Total solids	152.	171.	150
Loss on ignition	37.	42.	25
Mineral residue	115.	129.	125
Nitrogen as:			
Free ammonia	.012	.022	
Albuminoid ammonia	.072	.086	
Nitrites	.001	.002	
Nitrates	Trace	Trace	[illegible]
Oxygen consumed	1.30	2.20	[illegible]
Chlorine	7.00	7.50	[illegible]
Total hardness	97.2	103.	12[illegible]
Alkalinity	97.	96.	9[illegible]
Bacteria per c.c	100.	200.	10[illegible]
B. coli type:			
10 c.c	Present	Present	P[illegible]
1 c.c	Present	Present	A[illegible]
1/10 c.c	Absent	Absent	A[illegible]

Conclusions

1. Tonawanda is a small manufacturing city in the western part of the State on the Niagara river. It was formerly of importance as a shipping center but with the decadence of the Erie canal has lost a good deal of its importance. Its proximity to Niagara Falls and the availability of electric power from that city indicates a future growth which should not be interfered with by insanitary conditions.

2. The general death rate is low when compared with that of the State as a whole. The difference is, indeed, so great that the question is invited as to the accuracy of the registration and reports. The figures of the city registrar in some years show a rate lower than that of the State by 7 per 1,000 and the reason is not apparent.

3. The death rate from typhoid fever, except for the four years 1899 to 1902, are all above that of the State; in at least eight years of the last twenty-two the number of deaths has been so great as to constitute a prolonged epidemic. There is no indication of any decrease of rates of earlier years and the City stands to-day in opposition to the law reducing death rates which has been evidenced by the rates of the State.

4. The death rate among young children was high at the beginning of the twenty-two-year period considered but lately has decreased to about the normal of the State. There are still, however, sporadic years when the rate is high and the proportion of deaths of children to total deaths is at times above the average.

5. The death rate from diarrhea and enteritis is generally low but there are enough years of high rates to show that there are conditions in Tonawanda which affect the general health of children who reflect so plainly insanitary conditions.

6. The water supply comes from Niagara river, which receives the sewage from Buffalo eleven miles distant. Although probably the effect of this sewage does not extend into the river far enough to always affect the surrounding of the intake, analyses of the water as well as the death rate indicate that at times the quality of the water is affected and results in disease and death among the residents of Tonawanda.

Recommendations

It is recommended that the city of Tonawanda, by its board of water commissioners, take immediate steps to purify the public water supply of the city or secure a supply other than the present. It does not appear to be within the province of this report to specify how such purification shall be effected but that steps should be taken at once to bring about an improvement in the quality of the water seems to be so well determined that there can be no hesitation in making this recommendation as forcible as possible.

Respectfully submitted,

HENRY N. OGDEN,
Special Assistant Engineer

Copies of this report were inclosed in letters addressed to the board of water commissioners and to the other city authorities urging that steps be taken to carry out the recommendations contained in the report.

ACTION UNDER PUBLIC HEALTH l

REFERENCE TO STREA

The inadequacy of the provisions in affording proper control of strear ments to this law necessary to make dealing with the ever changing san State and in conformity with increa: in dealing with this important ques ject of repeated references and re reports of the past few years. In bill, chapter 553, entitled "An act Law generally." The provisions provement over the old laws an powers of the State Commissioner tain classes of sewage discharge. but insofar as it still excluded fi tain important classes of waste emptions in certain cases of sew action of the Commissioner of H or a danger to health actually ex sioner to effectually remove or ei waters is still largely restricted nullified.

With these limitations in mi serious cases of stream pollution desiring to avail myself of wh conferred by the new law, acti latter part of 1911 and during 19 to remove or purify their sewag requisite to the issuance of an or of sewage pollution, an investi and during 1912 such investig the Engineering Division of a on streams where sewage pollu

[

During the year general notice was served upon some thirteen of the municipalities, calling attention to the provisions of the amended Public Health Law and requesting advice as to the action it was proposed to take, to correct the unsatisfactory conditions of sewage discharge which were found to exist. In addition conferences were held with local authorities of a number of these municipalities. These preliminary actions by the Department were taken on account of the considerable expense which would be entailed in same cases by the necessary changes, and in order to give opportunity for voluntary action by these local authorities in making the necessary changes before the issuance of an "order to show cause."

As a result of the preliminary notices and of conferences with local authorities some seven of the thirteen municipalities have taken up the necessary preliminary steps of having plans prepared for sewage treatment works. In some three cases such plans have been submitted and approved and in two cases orders have been issued by the Department for the construction of the works.

INVESTIGATION OF SHELLFISH
JAMAICA BAY

Aside from infected water and milk, ir tionably plays an important role in the co from typhoid fever among certain classes The exact relation which these infected o typhoid mortality is not only uncertai practical and scientific reasons difficult

Numerous investigations have been and Federal authorities to determine t effect on public health in different loc and abroad. Among these investigati made by this Department in 1908 of t in the vicinity of New York city ar Island. The results of this investig in the 1908 Annual Report of the St

During 1912 a second investigatio was made by the Engineering Di Jamaica bay. This investigation visions of section 161 of the Cons report was not called for by the of the investigation from the stan and scientific information secured field studies and the rendering of in tabular and graphic form the cured. Although no analytical st as a result, not a complete report represents an important special i Division; and as a contribution subject, which for comparative future use, the completion of t partial report were well justified

The investigation included fi teriological examinations of oys forty selected stations in Jama

an Engineering and Laboratory force and a temporary laboratory established at Canarsie. Tidal studies were carried on to ascertain effect of tidal flow on variation of oyster and water pollution; special examinations of oysters from floating places and storage boxes; seasonal studies designed to show hibernation period; and finally special examination for purpose of isolating the typhoid fever bacillus. Aside from its possible future utility this investigation has in my opinion an illustrative scientific value of considerable importance owing to the comprehensiveness and completeness with which the investigation was planned and carried out, it having been planned on a scale such as has never to my knowledge been undertaken in any previous investigations of its kind.

POLLUTION IN NEW YORK HA
WITH THE PASSAIC V.

Attention was called last year to
entered by the city of New Y
General in the Supreme Court o
strain the Passaic Valley Sewer (
New Jersey from carrying into ex
the sewage of the Passaic Valley I
under certain stipulations embodie
between the State of New Jersey
preparation of New York's side
gather a considerable amount
amount of scientific information
request of the Attorney-General
engineering experts of the Depa

These services entailed a co
time of the Chief Engineer
of the Department during the
1912, including a comprehensi
tions of the harbors of the At
connection with pollution of sa
cal study of the effectiveness
between the United States an
submitted in connection with
testimony of the Chief Engin
1912.

The case is perhaps the m
has arisen in the country, a
elaborate reports and testim
represent one of the most va
on the important subject of

EDUCATIONAL WORK

Educational work along sanitary lines has been carried on by the Engineering Division during 1912 in three ways — by lectures and addresses; through the annual exhibit at the State Fair at Syracuse; and by means of a traveling exhibit at county fairs.

The amount of educational work through lectures and addresses was considerably more during 1912 than in any previous year. Some 33 illustrated lectures and other public addresses have been given by members of the Engineering Division during the year. In addition to participating in the programs of the Annual Conference of Health Officers at Syracuse and the Sanitary Institutes for Health Officers at Poughkeepsie, Elmira and Utica, addresses and illustrated lectures on sanitary engineering subjects have been delivered by the Chief Engineer at various municipalities throughout the State at the request of the municipal authorities or of civic and educational associations. Stated lectures have also been delivered by the Chief Engineer and the Principal Assistant Engineer in the courses in Sanitary Science and Public Health given at the New York Homeopathic Medical College and at the College of Medicine, Syracuse University.

The Sanitary Engineering Division exhibit, which is a part of the Department exhibit, at the State Fair at Syracuse, has come to be one of the regular and annual educational features of the Engineering Division. This exhibit consists largely of the display of plans, profiles, charts, photographs and other graphic illustrations representing the work of the Division in connection with public water supplies, sewerage and sewage disposal, stream pollution and summer resort inspection. One of the principal features of the exhibit, which has been shown now for a number of years, is a series of working models, in operation, representing various methods and types of sewage disposal works. These models attracted considerable interest and in connection with them brief lectures discussing the problem of sewage disposal and describing the constructive and operating features of the various types of sewage disposal works represented by the models were given by a member of the Engineering staff.

The attendance at the exhibit in 191 by the visitors were greater than in any which the exhibit has been shown. Th fying since it is a fair index of the i health work which has been aroused State.

In addition to the exhibit made at ment this year made a new departur essential facts of Public Sanitation t the co-operation of the State Colleg University, the Department was en county fairs and to exhibit there a photographs, diagrams and maxims exhibits in connection with which the members of the Engineering I tion and were a source of continu sands who saw them.

There is room for much activity ditions of living on our farms a it is believed that through these is afforded by which useful resu purposes and aims of the Depar

PROCEEDINGS OF THE TWELFTH ANNUAL CONFERENCE

OF THE

SANITARY OFFICERS OF THE STATE OF NEW YORK

PROGRAM

Wednesday morning, December 4, 10:00 a m. to 12:30 p. m.

Addresses of Welcome by the Mayor, Hon. Edward Schoeneck and Hon. Donald Dey, President of the Mystic Krewe.

THE HEALTH OFFICER AND THE TUBERCULOSIS LAW
Mr. Homer Folks, Secretary, State Charities Aid Association

Discussion opened by
Joseph Roby, M.D., Rochester

THE CONTROL OF SYPHILIS AND GONORRHEA

A. WHAT THE STATE CAN DO
J. N. Hurty, M. D., Secretary, State Board of Health of Indiana

B. WHAT THE MUNICIPALITY CAN DO
Powhatan S. Schenck, M.D., Health Commissioner, Norfolk, Va.
Guy S. Kiefer, M.D., Health Officer, Detroit, Mich.

C. WHAT THE PHYSICIAN CAN DO
John L. Heffron, M.D., Dean, Syracuse University Medical School

Discussion opened by
H. B. Besemer, M.D., Ithaca
Prof. Veranus A. Moore, Cornell University
Elizabeth H. Muncie, M.D., Brooklyn
L. A. Opdyke, M.D., Jersey City

Thursday morning, December 5, 10:00 a. m. to 12:30 p. m.

I For City Health Officers

SUPERVISION OF FOOD SUPPLIES

A. EDIBLES
F. B. Parke, M.D., Elmira

B. MILK
F. M. Meader, M.D., City Bacteriologist, Syracuse

C. WATER
Theodore Horton, C.E., Chief Engineer, New York State Department of Health

Discussion opened by
Mr. Lee J. Vance, New York

THE HEALTH NURSE AND HER WORK
John S. Wilson, M.D., Poughkeepsie

Discussion opened by
Francis E. Fronczak, M.D., Buffalo

A SANITARY SURVEY
Mr. M. N. BAKER, New York, :

Discussion opened by
H. O. BALL, M.D., Cortland

II FOR VILLAGE AND TOW

CONTROL OF COMMUNICABLE DISEA

A. PREVENTION
L. L. LUMSDEN, M.D., Surgeon,

B. CONTROL AT HOME AND AT SC
A. D. LAKE, M.D., Gowanda

C. DISINFECTION
Mr. JOHN L. RICE, Syracuse

Discussion opened by
MILTON E. GREGG, M.D., Elbri
WILHELM DREYFUS, M.D., New

HOW TO EFFECT IMPROVEMENT IN RU
Prof. H. N. OGDEN, Special Assista
Department of Health

Discussion opened by
WM. A. HOWE, M.D., Deputy Commi
FREDERIC C. CURTIS, M. D., Consult
State Department of Health
ALLEN W. FREEMAN, M.D., Assistant C
of Virginia

Friday morning, December 6, 10:00 a

THE RURAL DEATH RATE OF THE STATE C
FREDERICK L. HOFFMAN, LL.D., Statisti
Company of America

Discussion opened by
ROBERT P. BUSH, M.D., Horseheads

EPIDEMIC POLIOMYELITIS
WADE H. FROST, M.D., Passed Assistant S

Discussion opened by
HARLAN P. COLE, M.D., Consulting Orth
Department of Health
EDWARD CLARKE, M.D., Buffalo

THE PREVENTION OF INFANT MORTALITY
HENRY L. K. SHAW, M.D., Albany, Consu
York State Department of Health

Discussion opened by
F. W. ADRIANCE, M.D., Elmira

THE TEMPORARY CARE OF THE INSANE BY HE
JAMES V. MAY, M.D., President, New York
mission

Discussion opened by
D. M. TOTMAN, M.D., Syracuse

PUBLIC MEETINGS

(Fobes Hall, Education Building, 120 W. Genesee street, 8 P. M. daily, preceded by motion pictures at 7:30.)

Monday, December 2. For wage-earners. Under the auspices of Syracuse Central Trades and Labor Council, Mr. Thomas F. Gafney, presiding. Addresses by Commissioner Williams, New York State Department of Labor, and Mr. Paul E. Illman, Secretary, Syracuse Associated Charities.

Tuesday, December 3. For women. Mrs. Frederick R. Hazard, presiding. Addresses by Professor Charles W. Hargitt, on "Heredity and Eugenics," and by Dr. Elizabeth Hamilton Muncie, Brooklyn, author of "Four Epochs of Life," on "Girlhood, Wifehood, Motherhood."

Wednesday, December 4. General meeting. Dr. Edward J. Wynkoop, presiding. Addresses by Dr. Allen W. Freeman, Assistant Commissioner of Health, State of Virginia, subject — "The Interest of the Public in Public Health," and by Dr. W. S. Magill, Director of Laboratories, New York State Department of Health, subject — "The Importance of the Public Care of Food Supplies."

Thursday, December 5. For women. Miss Anna S. Huntington, presiding. Address by Dr. Henry L. K. Shaw, Albany, Consulting Pediatrician, New York State Department of Health, subject —"Saving Babies" (illustrated by stereopticon).

Friday, December 6. For men. Mr. H. W. Jordan, presiding. Address by Dr. Hills Cole, Director of the Division of Publicity and Education, New York State Department of Health, subject —"Manhood and Virility" (illustrated by stereopticon).

CONTENTS

Report of Proceedings of the Twelfth Annual Conference of the Sanitary Officers of the State of New York, Held at Fobes Hall, Education Building, Syracuse, N. Y., December 4, 5, 6, 1912

The Conference was called to order by Dr. Hills Cole, Director of the Division of Publicity and Education, State Department of Health, on Wednesday, December 4, 1912, at 10 A. M.

THE CHAIRMAN — The Twelfth Annual Conference of the Sanitary Officers of the State of New York will please come to order.

We are to be favored first with an address of welcome by Mr. Willard A. Rill, who is president of the board of common council, and who will speak on behalf of his honor, the mayor.

HON. WILLARD A. RILL — *Mr. Chairman, Ladies and Gentlemen:* On behalf of the mayor and the city of Syracuse I come here this morning to perform a very pleasant mission. I say "pleasant" because it is always pleasant to extend the hand or the arms of welcome; and that is my mission here this morning. And I come, esteeming it an honor and a favor to be allowed to come and to say to you that we are glad you are with us, even if you should — in slang phrase — take the notion to clean house for us. We appreciate the value of these conferences and the honor of having had this Conference select Syracuse as the place for holding its important conference, discussions and debates. We know, from a selfish standpoint, that much good will come to us through your presence here. We are likewise pleased at having you come here because we believe you will be pleased and delighted with the city.

Of course, theoretically, I am supposed to hand over to you the keys of the city of Syracuse; but long since have I departed from that worthy custom because Syracuse has such a warm welcome, and long ago threw away the key to its welcome, and its

doors are wide open, and you need no k
presence is sufficient for us to welcome you

As I said, we appreciate the value to tl
ence. The municipality to-day is much d
was some years ago. As you doubtless know
tions of government were legislative and exe
form; but a municipal government to-day
form of government, so we are told, and I be
From exercising executive and judicial functi
out until it enters into all the departments
citizens. Not only do we pass laws and ordi
government of the city, no longer does the e
ordinances and enforce them only, but we now
fort, pleasure, happiness and health of the
them from the scientific standpoint. Therefor
understand why we appreciate a conference of
because, without the experts, the municipal go
not do the work they are doing; for no gover
could be versed in all these different departmen
justify them in handling such subjects as they d
so we have to depend upon you men, and others
will spend their time, their forces and their energ
the best methods, and then inform us; and we, in
you, adopt those reforms and give the benefit of
citizens.

A municipality to-day is an absolute failure unl
co-operation of men interested in the different lin
as well as the co-operation of its citizens. You can
is. In the rural communities a man knows all h
and all they are interested in. If a man, woman or
or in distress in a neighborhood, each makes it his c
he takes it upon himself in a neighborly, brotherly
relieve or assist the one who is sick or in trouble.
grettable thing is when he moves to the city to make m
he forgets or leaves behind that kind neighborliness
in madly to make money; and he exacts much more fro
for his comfort, happiness and pleasure than he did
a rural community; but he does not consider it is

for him to co-operate with the city or municipality in any way; and he is ready to criticise and find fault if he does not get things in the latest fashion. Therefore, among the great problems of the city is the important one of the public health, and both city and State need the help you give them and the co-operation it receives from its citizens. The city should deal with the health of its citizens, but the citizens should further that assistance in so far as they can; and it is up to men like you and me to educate the public, and to make them realize that these things can only be accomplished with their co-operation.

I realize that you have accomplished much already in the different departments of government in this State, and I know you are to accomplish much more. In this city we are proud of our health department and the officer at the head of that department; and while we usually do not boast at home, we feel that he is really one of the first order. We would be pleased to have you come over and look at the exhibit we have in the City Hall. This city is willing to take the advanced steps you gentlemen advise in matters relating to the health of its citizens, in order that they may be safeguarded, and that all may be done to stamp out disease that human ability or human government can do.

So, gentlemen, I again say to you that the pleasure is mine in welcoming you here. All we have is open to you; and be assured that our welcome to you is as extended and broad as your willingness to receive; and we trust that while you are here your time will be most profitably spent; and may it be spent pleasantly. We trust you will come to us often, and in so far as we, in a civic manner, can assist you, the officials of this city are glad to do so.

We are glad to receive your further suggestions, as all of our departments of government are; and we trust that we may get health conditions so absolutely perfect that — while we do not want to discourage the doctors — they will have very little to do.

We trust all your sessions here will be pleasant, and if we can extend any hospitality or assist you in your labors in any manner, command us, and we will serve you with pleasure.

THE CHAIRMAN — On behalf of the health officers and the State Department of Health, Commissioner Porter will say a few words.

HON. EUGENE H. PORTER — My friend
feel perfectly at home, after a first hesitati
my old friends and see in front of me wh
Of course, there could be no further emba
for you or for myself.

I think we may say we have listened with
ure to the official representative of the lo
It is particularly inspiring and encouraging
official — and I use that word with no disres
nary official" I mean one who is not a healt
ciates the value of health work, and who app
his own health department, and who is no
anxious and glad, to praise his own health co
subordinates in that department. Syracuse is
in a state widely known for its sanitary wor
become firmer in our belief that the spread of
doctrine and enlightenment will not be confine
Syracuse, but will extend all over our state.

There are just about two things we can do
tion of knowledge of sanitation — one is the a
scientific facts, and the other is the diffusion c
among the people. That is education. When o
find out that diseases are preventable — or th
are — and when they find out that they are no
when they begin to ask: If disease is preventab
prevented? — then we shall have behind us a hea
midable proportions; and then the belief will b
that if disease is preventable, it is the duty of the
disease; and the state is as responsible for its n
the state is responsible for industrial accidents.

We are a most inconsistent people. Down in C
up the yellow fever; in Panama we swept that neck
and dug the ditch; in the Philippines we have in
sanitary reforms that it is now one of the wonders
government in the world. In these places we ga
officer power, and he enforced health mandates, an
was an incalculable saving of human life. In one of
of Manila the old death rate was something like 278 ;

icans in one year reduced it to 75; and it stayed there for a time until some inquisitive physician found out about the hook-worm, and that it was there; and then after using thymol it dropped from 75 to 15, and stayed there. That is what we did in those places; in a section of the country near Detroit there were between two hundred and three hundred experts of the national government working on foot and mouth disease; and then when cholera broke out in New Orleans, and out of 3,300 cases there were 455 deaths of human beings, the great United States government sent down twenty-one men! That is the difference, or was the difference seven years ago, between the values placed by our own government on the lives of cattle and those of human beings.

I believe the time is not far distant in our own state when the people will require protection in matters of health not only from our state government but also from the national government, against preventable diseases; and to-day, legally and scientifically speaking, it is practicable to prevent very many of the diseases that now ravage this country. I do not have to tell you about typhoid, with its enormous percentage of mortality. It is a most disgraceful record for this country, and the reason why we have it is because our people do not know about it. If they knew about it and demanded protection, and our health officers had the authority, how long do you think that record would disgrace the disease annals of the United States?

But, my friends, I am not here to make an address, I simply wished to thank our friend for his kindly speech to us, and to have the pleasure of seeing you all once more.

THE CHAIRMAN — Now, we will open our educational program, and I am sure we feel happy that it is to be opened by an old friend of the Department, and an old friend of yours who needs no introduction to you. Mr. Homer Folks, Secretary of the State Charities Aid Association, is with us once more, and this morning he is to speak on the subject "The Health Officer and the Tuberculosis Law."

THE HEALTH OFFICER AND THE T LAW

BY MR HOMER FOLKS

Secretary of New York State Charities Aid

I wish first of all to express my appreciati
partment of Health, for the opportunity of p
I have done once before, the general subject
Law. I firmly believe that no more impor
standpoint of the saving of life and the buil
has ever been placed upon the statute books
York. It has now been on the statute books
four years, and it is time, perhaps, to revie
the law, the manner of their enforcement, a
any, experience suggests in the terms of the

It is my purpose, therefore, in the twenty
me, to recall how the law came to be passe
provisions are; the degree of its present en
can do to further its enforcement without a
and what supplemental legislation might now

Speaking to health officers, I would like t
the inception of this statute was due to the
cities in which the Tuberculosis Exhibition
joint auspices of the State Department of
Charities Aid Association during the late a
ter of 1907 and 1908. You will recall that
which included, briefly, Utica, Rome, Troy,
tady, we endeavored to follow up closely t
meetings with the organization of definite
effect various constructive measures for the
In the course of the early stages of that wo
eral different health officers expressed this
under their general powers it might be p
all the things that needed to be done for tl
of households in which there was tuberculo
state of public opinion it would be difficul

gerous, for them to do so; and that it would greatly assist them in the performance of their duties, speaking from a scientific point of view, if there were upon the statute books some specific direction requiring them to take such and such steps under given conditions; so that when in doing so, they should run against the real or apparent interest of some individual or some organization, they could turn to the law and say, "You see, my dear friend, it is not a matter in which I am exercising my discretion. This is a duty which is imposed upon me by the law, and I am obliged to do these things or stand in the light of neglect to perform my clearly defined statutory duty;" or, in other words, the position of the health officer was a little like the process stated by the boy when asked to define how God made the world. He said, "He first made a place to stand on and then He made the rest of it." And I think it would be a free translation of the attitude of the health officer to say he first wished to have a legal place made for him to stand on, and then he would be able to do the rest of it. That was the inception of the Tuberculosis Law, which was thereupon prepared. It went through a pretty careful process of revision, which represented a more intensive study of existing legislation in other states and of the results of such legislation, than the preparation of any other bill with which I have ever been familiar; and it was enacted substantially as proposed to the Legislature.

It is, perhaps, worth recalling that the following autumn, 1908, the International Congress on Tuberculosis met in Washington, and the Jury of Awards considered the laws of all the different states in the Union. The New York law was awarded the second place in the order of merit among the statutes of all the states of the Union; and it was stated that it was not placed first only for the reason that it was so recently enacted that it had not yet stood the test of actual experience, while the Wisconsin law had been in effect for several years.

Now, the provisions of the law, in brief, as you will recall, and which I now recall only for the purpose of readier discussion, are these: That all cases of tuberculosis which come to the notice of a physician shall forthwith be reported by that physician to the health officer of the city or town. That the health officer shall

make or cause to be made an examination of all sputum sent to him by any physician as that of a person presumably having tuberculosis. That on the death or removal of a person having tuberculosis, the fact of such death or removal shall be reported by the attending physician, or, if there be no attending physician, by the landlord or the owner, to the health officer. That he shall thereupon provide for the disinfection, cleansing or renovation of the premises, and that they may not be reoccupied until so cleansed, disinfected or renovated. That a person who insists upon spitting about and making himself a dangerous menace to others shall be reported to the health officer, and warned by him, and if after such warning he persists in so doing he shall be taken before a magistrate and punished. That the attending physician shall take all measures necessary to protect other members of the households, where they are in attendance, against tuberculosis.

Most important in the minds of the framers of the bill, which was very complicated, were the provisions for the procedure and precautions for safeguarding the other members of the household. We provided in substance that a blank should be prepared by the State Department of Health; that it should be in the hands of each health officer; that it should be sent to the attending physician when each case is reported; that it should enumerate everything to be done where there is tuberculosis; that the physician shall thereupon decide either that he will undertake those procedures and precautions, and thereupon do so and report to the health officer that he has done so; or shall decide that he does not wish to do so, and turn over that duty to the health officer, whereupon it becomes the duty of the health officer to take these procedures and precautions; and when he carries out the work he is entitled to the munificent sum of one dollar for his fee. There is a general penalty, and one or two specific penalties for particular failures to obey the law.

The first fact to which I wish to invite your attention is, that although we feared — recognizing the fact that the law was at that time considerably in advance of public sentiment — although we feared that serious efforts would be made to repeal it, there has not been in the four years which have since elapsed any serious proposal either to repeal or substantially to modify or

reduce any of the provisions of that law. It has not been necessary for us to remain in organization to withstand any serious effort to repeal or greatly diminish the force or effect of that law. To me, that is very gratifying and surprising.

How far is this statute carried into effect? It goes without saying that no law which involves the co-operation of many thousand practitioners throughout the State and of not less than fourteen hundred health officers, will not enforce itself or be carried into full effect at once or in the very early future. That has not been the history in the matter of reporting deaths; that is not the history for the reporting of births; that is not the history for the reporting of contagious diseases; and I am ready to take the stand and demonstrate, to my own satisfaction at least, that this law has made greater progress toward enforcement in these four years than any other comparable law ever enacted in this state which depended upon the active participation of all the medical profession and all of the health officers. We have had for a long while a law for registering births, and yet it appears to this day that comparatively few children are born in the cities of Albany and Troy, according to the official reports; but you know better than I do the extent to which all these laws calling for the reporting of disease and births and deaths are not carried out.

Considering the matter first in the large, rather than in the particular,— to what extent is the reporting of tuberculosis by physicians now done? On that point we have taken the very valuable reports and monthly bulletins of the State Department of Health and compiled two sets of figures covering that portion of the State of New York outside of New York City — for New York City stands by itself, and began its own reporting of cases years ago, and it has peculiar and unique provisions in its sanitary code.

I will take just a moment to recall to you the number of deaths from tuberculosis each year, pulmonary tuberculosis, in New York State outside of New York City, since 1907; and also the number of living cases reported each year during the same period of time. It is an instructive comparison:

Date	
1907	
1908	
1909	
1910	
1911	
1912 (to October 1st).	

You will notice that for the year 1909, number of cases reported substantially ex deaths; so that it is evident that not all were in the terminal stages of the diseas about to die.

There are two extremely interesting fa the basis of those figures: the first is the rate, in the actual number of deaths (notv in population), from 5,400 in 1907 to 5, encouraging is the fact that for the first (1912) as compared with the first nine decrease in the number of deaths from p the State of New York outside of New drop of 5 per cent. If we can even co this year, within a period of time clear cut the number of deaths from pulmon And if we can continue to increase the in the same ratio shown during the las shall soon have a large proportion of culosis reported.

Looking at the matter, by and large, tics much cause for encouragement wit elation, but only cause for redoubling o

When we come to analyze these figur up city by city, and county by county so satisfactory by reason of the fact tha reporting the cases and in what is do is very uneven in the different cities secure first-hand information in regard

have direct and personal conferences with the health officials and the health officers throughout the State, and with our local committees, we were fortunate in securing the services of one of your own number, Dr. Prest, of Waterford, who during the early part of this year visited all the health officers of the cities of the state, and in nearly all cases conferred with the boards of health and the local committees for the purpose of ascertaining exactly how in each city the law was working.

There are, roughly speaking, just fifty cities and large villages in the state; that includes three or four villages that should be cities, but which are not yet incorporated. In twenty-five of these cities the number of deaths exceeded the number of cases reported; so that in the other twenty-five, the number of cases reported largely exceeded the number of deaths. In other words, in about one-half of them we have made but little progress since 1907. And the question before us now is how soon are we going to bring all parts of the state up to the standard of the most progressive of the cities.

In regard to the provision calling for disinfection, cleansing or renovation of the premises after a death from tuberculosis or a removal, Dr. Prest finds that so far as disinfection or cleansing after death is concerned it is carried out in the great majority of cases; but not all. But there is the widest possible variation as to the precise process and the presumable effectiveness of the process of disinfection, cleansing and renovation. After all, in regard to the disinfection, cleansing or renovation after the removal of the patient, this rarely occurs except where visiting nurses are employed, because the fact of removal is very seldom reported by a physician because in most cases he does not hear of it, and the owner of the premises does not care to make the report.

In regard to the careless spitting, it would seem, judging from the extent to which that law is carried out, that there are no careless spitters except in Buffalo. In Buffalo a policeman went out accompanied by a nurse or an officer of the Department, and the policeman warned the careless persons with excellent effect. I should say that no one can read the report through without feeling that in Buffalo more progress has been made than in any other large city of the state outside of the city of New York, with which I do not pretend to make comparison.

As to the Procedure and Precaution mittedly the most far-reaching, though section to be carried out, there is the lea be given. On the face of it, in many although in five cities there were health o: of the Procedure and Precaution blank; on hand or think they were required to us cities the blanks were on hand and more rather formidable looking blank, and my at the time was that it should be so; and and expectation that the attending physic too much for me. I cannot bother with after the household, and I will turn it o It being his special field, I counted on rule, however, the attending physician attempts to fill out the blank. He does more office calls on him by the patient. knowledge of the household condition, a upon to put his Procedure and Precau making a charge for a call. The pati the physician to save a part of the cost; is made by the attending physician. W and where the physician is willing to tu the household to the tuberculosis nurse health department, a different story ca more satisfactory way for me to bring that in forty-eight localities of the sta City, sixty-eight visiting nurses are reg culosis work.

I think we have learned two things ir with this law; the first is, that the assu reporting legislation, that sick people ha is an untrue assumption, and that the having tuberculosis — far more than a ber — have no physician. Many of t ill. Many of those who do know son them do not go to a physician becau sick enough; or they think they cannot

are afraid he will tell them they must stop working; or they do not believe the physician knows anything about it — or perhaps, or maybe, he does not. Therefore, if we had every case of tuberculosis under medical care reported to-day by the physicians we should have a pronounced minority, notwithstanding all of the cases, whether reported or not are in a condition to actually spread disease. So we must have other means for finding out where the people are than simply relying upon the report of the physician in a case of tuberculosis.

Secondly, as to those persons who do call upon a physician, possibly once, and not again, the physician does not, and in the nature of things cannot, know enough about their home conditions and cannot visit the home sufficiently frequently to exercise that degree of authority which is necessary to protect the other members of the household. So that on both counts, it is perfectly evident to me we cannot rely upon the attending physician unaided, for either the reporting or the oversight.

As to possible changes in the statute, I will just hastily enumerate five or six:

First: I do this tentatively and only as a suggestion; first, the suggestion that not only physicians should report cases of tuberculosis, but that laymen, nurses, teachers, landlords, and any citizen shall be authorized and encouraged to report to the health officer, as a presumably suspicious case, and for the purpose of looking up and for diagnosis, any person coming to their knowledge who appears to have tuberculosis or some disease of that general sort or description. In a few cities in which the largest number of cases has been reported, it has not been by the physicians they were discovered primarily but by the visiting nurses, through calling upon teachers who find children are kept home because "Father is ill," or through employers or clergymen or through other sources.

Second: Require every city and county to employ visiting tuberculosis nurses, one for each fifty reported cases, and require the nurses to work under control of the health officer, and with the knowledge and approval of the attending physician, if there be one.

Third: Make it the health officer's duty against physicians who fail to report cases notification.

Fourth: Make the original reporting call for information as to occupation an possible for the report to come in by tele personal call — or any way.

Fifth: Strengthen the provision abou providing, in some conservative manner, fined but sent to a tuberculosis hospital definite and extended period of time. Th city of New York, and there are 100 pa Island, compulsorily detained.

Sixth: Provide additional compensat because of the additional duties which w

Seventh: Authorize the State Depar rules and regulations, and to amend th to the manner in which the disinfection may be carried on, so there may be som that proceeding.

Eighth: Take out the penalty in the as tuberculous patients not suffering f is stated as one cause for physicians no

In conclusion, I desire to express Charities Aid Association our marked come extended by the health officers of t tive; our appreciation of your unifor the State; our desire to work with yo your best judgment in the attempt to the law, and to ask you to join hands fealty and devotion to what is our grea for the saving of human life.

THE CHAIRMAN — The most valuable featu the discussion, which we wish to have as and may I say it will be the rule of the co in the discussion must come to the front, nea and address to him, so they may be made a

DISCUSSION

DR. JOSEPH ROBY (Rochester, N. Y.)— Our future sons and daughters will have been saved from infection as a result of the Tuberculosis Law, if the same progress can be made which is intimated in the last paper. Although the figures given by Mr. Folks are encouraging, no one need flatter himself that the fight is won or anywhere near it. There is not much doubt that some additions can be made to this law; but as it stands to-day I should like to see what would happen if the law was carried out; for I entirely agree with Mr. Folks that this is the most important public health measure that has ever been passed.

Why is it poorly carried out in some places and not so in others? It is up to you, gentlemen, as public health officers to give the law a fair trial and see that the physicians report their cases by persuasion, if possible, but by fine if necessary. See to it that the removal of patients from one place to another is reported, and that premises are disinfected. I lay great stress on the latter as it brings home to the people the fact that tuberculosis is a contagious disease. The law will not accomplish much unless there is a real sentiment behind it.

If every case of tuberculosis — incipient and advanced — was doing the best thing for himself, he would be doing the best thing for the community. In other words, if every case was sitting and sleeping outdoors and did not contaminate the surroundings, it would be to a large extent innocuous. To accomplish this end one must make an early diagnosis and persuade the patient that he has tuberculosis. Mr. Folks said there was some trouble about that. I believe there is. To this end I find that tuberculin reactions are of great value. If you can show the patient a red spot on his arm as a result of a test, he will be more likely to believe you. The expert physician can hear the test of the lungs all right, but the rest of us cannot; but we can tell a positive tubercular reaction, accompanied by a little afternoon fever, and other points. Many things are called "tuberculosis" that are not.

We had a meeting in Rochester and some patients were brought from Raybrook, and some fine tests were made; but the average man does not hear those things — he is either too busy or won't take the necessary time.

I do not mean to say every person with reactions to tuberculin tests should be run off to Raybrook or Saranac; but if there was also an afternoon fever, a rise of pulse and a loss of weight, I would take more notice of the matter than I would of the physical test. I believe it is the duty of the health officer to persuade the general public of these facts.

As for the other things which Mr. Folk address, and especially in relation to the enf and more opportunity to compulsorily det heartily believe in that. I think it should be d It is too radical a change to put into the individual.

Then, as a sort of philosophical bias, I w good deal of this in the hands of the indiv vided we can educate the physician. I b physician is a great factor in each family hang on his words and believe what he say over his head too much, you are liable to get you are more or less of a crank; and I think our educational work with the family physic

DR. H. O. BALL.— In my experience in tuberculosis patients in the city of Cortland is one place where the law should be ame portion relating to publicity and nonpublicit neighbors and friends are too anxious to think is tuberculous. They say, "Have yo son on your record?" I tell them the rec

If we had a modified sign which we co saying "This is a case of Suspected Tub culosis," and "We are watching it;" then we are watching it. The tuberculosis reg 7th of February; we had then sixty to se city; and we have now fifteen cases. If w placed on the house of those recorded, then not recorded, and get them all on the list.

The old idea that cancer was a sign of losis was a disease due to sin or someth which I think the people are beyond now.

The other thing is to have a law to he those cases that are reported as matters c is with this blank we have. Within a wee by a physician seven miles away from his on the blank that he is willing to look aft physical impossibility. When I went int if he had tuberculosis and spoke to his hands and said, "Don't tell him; the dc know it." We should get rid of such pra

DR. A. D. LAKE.— In the country in visiting nurse. She has been able to fir

many cases as have been reported to her, or that have been reported to the health officers in the district in which she lives. The failure is right there, gentlemen, to a large extent — between the attending physician and the health officer. It seems to me that tactful, careful communication between those two men in all localities would help wonderfully to get things in shape so that something might be done.

A health officer has no business to step into a house under any circumstances, in my opinion, without consulting with the attending physician. He should do it in a congenial and careful way. I do not believe that one-tenth of the cases of tuberculosis are known — that is, not known in the curable stage, and simply because they are not reported.

DR. PEARSON — The question I would like to have settled is: How will you stop men from spitting? You can pass all the ordinances you want, but a man will go along and almost vomit up a lot of sputum; I have seen many such cases where I have ordered it shoveled up and buried.

In our community there was a great deal of hog tuberculosis at one time; and I think it resulted from these tuberculous persons going to the hog pen and spitting near the hogs. There were twelve cases of hogs which died from tuberculosis and had lungs and livers filled with tuberculosis. The hogs were buried. This did not increase my popularity among the people where this occurred. One man said he would eat the meat but he would bury the liver and lungs. He was a hotel-keeper, too. How can one stop that?

DR. GIBSON (Huntington)— Dr. Roby said that rigid quarantine might be too radical; but in my opinion cases of tuberculosis should be looked upon as being as serious as smallpox. Certainly it is more widespread and far-reaching; and I believe that cases of tuberculosis that are recognized should be placed under the control of the municipality in which the patient resides and cared for as closely as a case of smallpox. Unfortunately, smallpox has been known for so many years as a loathsome disease and one destructive of personal appearance. But if we have lost here 5,400 people annually in the last four or five years, we have certainly lost more in that way than through homicide; yet the State spends a great deal more for the prevention of homicide than it does in the case of tuberculosis. If we brought these matters to the attention of our representatives in the halls of legislation, I think we should be able to prosecute those cases of tuberculosis as readily as homicide. I am not going beyond my province in taking this stand, in my opinion.

DR. BURR (Binghamton) — I agree
Tuberculosis Law should be amended in
ever considered what it makes every p
New York do? Every physician in the
committed a misdemeanor — you and I,
320 says, "Every physician should re
name, age, occupation, color, sex, within
he learns of the case."

Section 321 says that "the sputum sen
be accompanied by a blank giving the name
sex, etc., and where employed last."

Section 323 makes it incumbent on the
notify the health officer of the removal of
residence within twenty-four hours.

Section 327 provides that the attending phy
precautions and give the proper instructions
safety of all individuals occupying the same h

Section 328 provides that the attending phy
a blank sent to him by the health officer and re
officer without delay; or in case he is unable to
immediately he must give notice. The attendin
make regulations for sputum cups; and the att
must not make a false report.

Section 330. The attending physician is to rep
of the patient.

Then it states that the general penalty for violat
tion or provision of this law is from five dollars to
with a special clause of one hundred dollars if you
falsely.

As I said before — every physician in the State o
has committed a misdemeanor under this law. And
matter which goes before the local boards of health, i
law; and any disgruntled friends of yours can go befo
tice of the peace, swear out a complaint and you have
at all.

MR. HOMER FOLKS — I think the physician rather
the danger there, as it says "knowingly" fails to repor
the thousands of physicians and the fourteen hundre
officers in the State of New York that cannot be a very i
danger.

In regard to the point raised by Dr. Ball, I am in sy
with the suggestion that the secrecy be removed; and I am
to confess that the only reason it was suggested at the outs
to sugar-coat the pill to get the bill passed. If we can ta

the coating without losing the pill, I am perfectly satisfied. My suggestion is that the register should be used as the health officer should determine. It should not be open as a mailing list for consumption cures or anything like that. I should leave it to the discretion of the health officer.

But far more important than all these questions is the question of having hospitals. While it is true in a fewer number of cases now than four years ago, still in many counties there is no place to send a man, even if he is willing to go, much less to send him if he has to be committed.

Lastly, it is a very substantial grief and regret to me that the attending physician cannot, in the nature of circumstances, do all I thought he could do in the outset; and partly because our committee was made up of laymen that went the limit in placing the responsibility on the attending physician, and in all our publicity work and exhibitions we have done everything possible to strengthen the position of the physician in the community and to spread abroad the idea that everybody should consult the physician, and that he is the man who must tell you what to do. And we have done all possible to strengthen the hands of the health officer. But we cannot expect the impossible, and it is more and more clear to me as time passes that we must increase the public health service; that a larger number of physicians must be in the service of the community; that they must be specially trained for that service and paid a sufficient and adequate sum; and if we were to leave the superintending of disease to the attending physician, he must visit the household, and go not once but subsequently, and we should pay him not one dollar, but ten or twenty-five dollars for services worth that amount.

THE CHAIRMAN — Last year we devoted one paper at our conference to "Unreported Communicable Diseases." That was the entering wedge, as far as the state was concerned, in its conference program, with the question of the control of syphilis and gonorrhea by state forces. During the past year public opinion has moved, and we are now prepared to consider what steps we can take, if any, to bring under control these two communicable diseases, the prevalence of which we know well but which we do nothing to control. New York State has not done very much in this direction. New York City has made a start, but outside of the city nothing has been done; so we have asked some gentlemen to come and give us of their experience and tell us what can be done. First, we will discuss it from the standpoint of the State Administration; and it is my pleasure to present to you in this connection Dr. J. N. Hurty, Commissioner of Health of the State of Indiana, and President of the American Public Health Association.

THE CONTROL OF SYPHILIS AND GONORRHEA—WHAT THE STATE CAN DO

BY J. N. HURTY, M.D.

Secretary, State Board of Health of Indiana

The problem of the control of syphilis and gonorrhea is truly a Gordian knot. The Alexandrian method of cutting is barred, yet it would be of some virtue if it were allowable, for prevention, like cure, is not altogether extra-surgical.

In the last analysis it may appear that therapy blocks to some degree, the control of these ancient and dishonorable maladies. When it was announced that 606 was an infallible cure for lues, not a few there were who said — "no reason now why pleasure should not be unconfined." And this is one instance, which would sustain an argument that might be given supporting the contention that therapeutics has not materially aided in strengthening the human race. Had it been written, *the gonorrheics and syphilitics, they shall speedily die,* then it is fair to presume that the problem of control of these twin leprosies would not have assumed the present colossal proportions. The commandment would have worked for the good of the race in two ways. First, the infection carriers would not long be a menace to their fellows, and second, the certainty of speedy death would cause those to contain themselves who are of fit material to survive.

CATCHING THE BEASTS

I recently saw a moving picture where hunters in Africa had caught a hyena by one foot in a steel trap and were trying to cage him, for even at the risk of his escaping they desired to exhibit the beast. As one would imagine, their efforts were not remindful of a picnic. However, the first step, catching the beast, had been successful, and the last step, although of a character to engage the highest powers of the intellect, was rather minor. But let us not forget, that when caged, the hyena must be kept caged, for if he escapes, the results which might follow among men would probably be worse than existed with him in the original

free state. In other words, if a degree of immunity has come to the race against syphilis and gonorrhea after ages of affliction, that immunity would be lost if the diseases were prevented for a period; and then, if they reappeared and the secret of prevention were lost or abandoned, the race would again wade for ages through an awful mire of scabs and pus to the immunity goal now attained. Whether this argument be good or bad, it seems to lead to a conclusion long since attained — that man was made to mourn.

But how may the beasts be trapped and caged? Society, as at present developed, will not permit them to be killed, and so they must be caught and confined. The first move toward trapping is to banish prudery. So long as this small vice exists and masquerades as a virtue in the minds of people, just so long will it prevent the free and full discussion of sex problems, which must be tackled and understood, before the slightest headway can be made.

I therefore venture at this point to present a brief analysis of prudery, the great obstruction to progress against venery.

PRUDERY

Prudery is not a virtue. On the contrary it has many of the characters of a vice. It is to virtue as a flowerless weed is to a rose.

Prudery, if skilfully trimmed, guarded and protected, may be cultivated into a second rate flower, but it is perilously likely to make of the body and mind a wilderness instead of a garden.

But what a hold prudery has upon us. Were it not for prudery, the most important of all problems in social and economic science, the sex problems, would now be in a fair way of solution. Procreation is the chief end of man, it is his immortality; through it he may best glorify God and enjoy him forever.

But, says prudery, we must not teach our children about this part of their lives because it is indelicate and impure. But this is untrue. So, our children are permitted to learn about sex relations and functions, not in innocence, honesty, self-respect and dignity and honor, but in secrecy, error and vulgarity. Prudery may not unjustly be blamed with a not inconsiderable proportion

of the syphilis and gonorrhea which
physically and morally.

"God created man in His own
created He him; male and female
attitude of the Christian world is such
that it thinks there was something
of sex and the methods chosen for the

How passing strange are many o
society, we institute governments,
churches, we build prisons, almshouses,
idiot asylums, all for the purpose of tr
ing and controlling ourselves. We dec
alcohol and drugs, we pass pure food lav
whereby we may know if we are recei
measure. We organize societies to take c
we enact laws prohibiting and preventing t
cal sanctity; but when it comes to the con
prevention of the causes of these evils and
restrained from wise and practical action by
teachers, ministers and physicians, all of v
during the development of the human body
sible for it, shun the question as though it w
situation is really disgusting and it would be
government commission or a research committe
cover — when, how, by what means and through
disgusting thing called prudery get such a hold

It was a welcome sign, a healthful sign, physical
when a ministerial association at Richmond, Ind
recognized the importance of fighting syphilis and
of preventing the procreation of defectives and fav
lutions the seeking of some practical means of lesseni
price this nation is paying for its false modesty. T
tion suggested that the issuance of a certificate of healt
wishing to enter the marital state be made the compu
cedent to marriage. Why not? If God created man in
image, is it not the duty of the church to keep that c
free from pollution as possible? Are we to think less o
beings than we do of our live stock, to protect the pure

which we have laws, written and unwritten, laws based upon medical science.

We are entering an era of conservation of natural resources, minerals, wood, water, soil; we are fighting for laws to stop the spoliation of these material things, to prevent their waste and mutilation, to stop excesses in their use, which amounts to abuse. We do this not for ourselves, but for posterity. What are we doing for posterity in the protection of human blood and of human health? We are permitting thousands, tens of thousands, hundreds of thousands of human beings to marry and reproduce their own kind, when at the time of their marriage they are degenerates or they are afflicted with syphilis or with gonorrhea or possibly with both, which diseases will not only cause death, but will visit themselves upon the third and fourth generation in the forms of blindness, bone disease, insanity, imbecility, nervous wrecks, all varieties of tuberculosis, degenerates and perverts. We are doing this because we will not stop it, not because we cannot. It is puling prudery which prevents. We are filling our almshouses, hospitals, jails, penitentiaries and homes for the morally and physically unfortunate by our refusal to meet the social question, the sex problem, the prevention of the procreation of degenerates, in an honest, sensible, pure-minded manner. The medical fraternity knows the horrible price modern society is paying for this prudery. The records of their hospitals and private practice, were they made public, would be a blow that would stagger humanity.

TEACHING THE YOUNG

With prudery subordinated, the ground would be cleared and the building of the ramparts of education against the venereals, could begin. And this education is to a great degree the work of the State.

To subordinate prudery in some part at least, let every physician urge the mother whom he attends in childbirth to be sure to teach the child before puberty arrives and during its innocence, the wonders and the holy character of sex and procreation.

Teach that procreation is the most important function in life, that it is holy, that it is not a subject for jest, that it should

always be approached reverently, and that
debase and discredit one's mother.

Let the mother exalt the idea of parentag
treat the subject as a matter of course. Sex
some time. To do as we now do, let it be
in error and vulgarity, is a potent way to in
the venereal plagues.

Of course, the teaching should include inf
the results of unchastity. The awful truth
diseases which attend promiscuous and uncont
should be forcibly presented. I would deeply
young minds the rewards of virtue and the pa
teach them to fear and tremble at the thought
outside of wedlock, and to loathe the prostitute
leper. Such training as this at the mother's knee
of any good teacher would surely do much to kee
the venereal rocks.

THE STATE'S PART

The part the State has to perform in this most
is not minor. First, it must declare in solemn sta
be unlawful for one to poison another with venereal
declaration is already made in regard to arsenic, b
only the individual, while syphilis poisons the race
is now unlawful to be in possession of dynamite or
explosives, except under certain conditions. Let it
syphilis and gonorrhea, excepting innocent cases only
they must come under the law's direction. No matter
pox is acquired, still it must be quarantined, and grea
unquarantined because it is a social disease and prud
Yet, great pox kills, let us say, at least sixteen to one
pox, and poisons the race besides. The Utah Medical A
urges a law "making it an assault and a felony for an
to communicate any venereal disease to another person, th
being considered wilful if an infected person shall no
a medical certificate signed by a legally licensed physician
shall state that he has applied the recognized clinical and
tory tests of scientific medicine and finds the person nam
the certificate to be free from all symptoms and taint of ve

disease." It is apparent the law should require the reporting of all cases of venereal diseases to the health authorities, first, for statistical information, and second, to make possible the practical application of preventive measures. This is indeed a necessity, if the State is the least interested in protecting human life and securing happiness. So far as I am informed only three States have risen to this plane, namely, New York,* New Jersey and Utah.

At the last meeting of the Indiana State Medical Society held October 10–11, 1912, a series of resolutions were adopted advocating the reporting of venereal diseases and placing them on the same basis as other contagious and infectious diseases. This action has been a long time coming and was not taken until the matter had been presented before several meetings. Now, as it is certain that professional and public sentiment favor department control, the State Board of Health will add syphilis and gonorrhea to the list of reportable infectious diseases at its next meeting. Then Indiana will be added to the list of banner states which stand for war by law against the social plagues. It is surely true that notification will have an educational influence of the highest value: The promulgation of the rule will bring publicity and cause discussion of these diseases, and thus will be overcome, at least in part, that miserable prudery which stands so strong against action. No doubt the records for the first year will be faulty, possibly for several years, but however incomplete they will do something toward arousing the public to the magnitude and extent of this danger to health, life and morals.

The circular of the Indiana State Board of Health entitled — *Social Hygiene* vs. *The Sexual Plagues*, which has now reached its fifth edition — 110th thousand, has spread wide information throughout the State concerning the nature of syphilis and gonorrhea and the modes of their contagion, direct and indirect. This circular lays special emphasis upon the fact that these diseases are contagious during a prolonged period and contagious even after apparent cure.

Another force against these evils has been the pathological

* New York State does not require the reporting of syphilis and gonorrhea. — EDITOR.

laboratory of the State Board, the services of
And such laboratories in other states and
have certainly been highly serviceable and
more so.

Ravogli declares — "The compulsory exan
who makes it a business to sell their graces is
defense against venereal diseases." He furth
pose of the sanitary inspection is to find out t
and place them in condition not to infect oth
right of social defense, it is a duty of society t
munity from contagious and infectious diseases.
all agree with this declaration in greater part;
to me that virtue itself, the arousing of it when
education, promises further reaching and more p
than compulsory examination. In other words
compulsory examination second and not first in im
law requiring the prostitute to be examined and to be
should apply also to the male prostitute. But how
the male? that is the question. Doubtless civilizati
solved so many difficult problems can solve this on
already advanced, the law should make poisoning by
a felony. In the words of the Utah Medical Society
the offense wilful if the offender does not have a c
cleanness from proper authority, thus showing the poi
accidental on his or her part.

Let such a law exist, and the young man who has
wild oats and in the process acquired venereal disease, wi
with great caution before he runs the risk of poisoning ar
girl after marriage.

In the drama by Brieux entitled "Damaged Goods,"
Dupont, syphilitic, was plead with and finally ordered
doctor not to marry. The story of the wreck of innocen
the wreck of his domestic life, the story of diseased c
almost certain to appear, and the final solemn command
physician, did not control him. He married and every p
natural penalty followed.

Now who will say, that a statute making his act a crime,
not very likely have led at least to postponement of marriage
he was cured?

SUMMARY

1. The individual prophylaxis which consists of early education in sex knowledge, and the awful results of promiscuous coitus with prostitutes, would certainly be of great worth in preventing venereal diseases. This education after puberty would not be so effective as if given before puberty in the age of innocence.

2. As prostitution is the principal source of these diseases, therefore the rigid control of prostitution must constitute the most important measure to check their spread. Coupled with this must be the positive declaration of law that it shall be a felony for any one to transmit gonorrhea or syphilis to another, the law setting forth clearly the conditions under which wilful or knowing transmission shall be considered to exist.

3. Segregation has proven an absolute failure, probably making matters worse. But police registration and inspection are effective to a good degree dependent upon the honesty and probity of the police. I would not recommend inspection of prostitutes for the purpose of securing a healthy public coitus after the same manner as inspection of food is to secure pure food, but for the purpose of discovering every foci of disease and abolishing it so far as possible.

4. A special hospital for venereal diseases will be found as necessary for controlling them, as is a special hospital for controlling diphtheria and scarlet fever among the poor in large cities.

These rules are offered by Dr. Ravogli of Cincinnati, taken from the *Lancet-Clinic:*

1. All inmates in the houses of tolerance to undergo a sanitary examination not less than once a week.

2. The visit should be made by a physician, well skilled in dermatology and syphilology, appointed by the board of health, together with an officer.

3. The house should be inspected, and no more than one girl should occupy one room. The plumbing, lighting, etc., should be examined.

4. No certificates of health are to be given; any one of the inmates found diseased is to be taken to the hospital.

5. Every woman found in these houses who has not been reported and has not been examined will be arrested and the house closed.

6. Every woman who keeps a house of t
the police department any changes; also as
ing, giving her name, age and where she c

Rules for clandestine prostitution:

1. Girls frequenting public halls, cafés
be secretely investigated by the police.

2. If it is found that they have no fan
they are not working, and that they have fr
this will be sufficient reason why they should
pensary and examined.

3. On complaint of a male visitor who ha
girl must be examined, and, if found disease
the hospital.

4. Under the rules against the spreading of c
they must be confined in the hospital until there
of infection.

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In reference to the hospital for venereal patients

1. The hospital for the venereal patients must be
secrecy.

2. It must consist of small wards with no more
six beds.

3. Colored women must be separated from the whit

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Dr. Powhatan S. Schenck, the Commissioner of Health of the city
folk, Virginia.

THE CONTROL OF SYPHILIS AND GONORRHEA—WHAT THE MUNICIPALITY CAN DO

BY POWHATAN S. SCHENCK, M.D.

Commissioner of Health, Norfolk, Va.

I wish to thank your State Commissioner of Health most heartily for the opportunity given to me to tell you in a plain, straightforward, businesslike way what a municipality can do, and what one is doing, for the betterment of conditions in the matter of social disease.

Frankness compels me to say this work was not taken up wholly on our own initiative, but was rather forced upon us, not only for the protection of the health of our community but in the conservation of our business interests. My home town, Norfolk, Va., is a seaport town wherein much shoreleave is given to thousands of our United States Navy sailors. We frequently have 6,000 to 7,000 on leave there at a time. The surgeon-general of the navy complained bitterly against the infection of his sailors, claiming that the first duty of the United States was to keep its fighting force intact. A commission was appointed and it was headed by Surgeon Lunn. He reported that there was more infection in that city than elsewhere, and he recommended that no shoreleave be granted to any attache of the navy during the months of May, June, July, August and September. That meant the loss of several million dollars annually to our commercial interests, so we decided to investigate the matter. When we started, I was told the preachers would roast me from the pulpit, and social workers charge that we were encouraging prostitution. I did not believe it.

The morbidity, the direct and indirect mortality from the social diseases, gonorrhea and syphilis and their sequelæ, is greater than that from all other communicable diseases combined, and the blighting and baneful results therefrom, together with the economic loss to society, probably ranks all other diseases. The human race would be much better off if some of the diseases from which it suffers so bitterly, would bring death more swiftly:

6. Every woman who keeps a house of tolerance must report to the police department any changes; also as to any new girl arriving, giving her name, age and where she comes from.

Rules for clandestine prostitution:

1. Girls frequenting public halls, cafés and public balls must be secretely investigated by the police.

2. If it is found that they have no family support and that they are not working, and that they have frequent male visitors, this will be sufficient reason why they should be taken to the dispensary and examined.

3. On complaint of a male visitor who has been infected the girl must be examined, and, if found diseased, must be sent to the hospital.

4. Under the rules against the spreading of contagious diseases, they must be confined in the hospital until there are no more signs of infection.

5. If they intend to reform and enter a family in the capacity of domestics, or engage in any other work, they must first be cured, and then it will be permitted.

In reference to the hospital for venereal patients:

1. The hospital for the venereal patients must be guarded with secrecy.

2. It must consist of small wards with no more than four to six beds.

3. Colored women must be separated from the whites.

4. A sewing room should be connected with the department to compel the girls to do some kind of work under direction of a matron.

5. No visitors should be admitted to the wards except on extraordinary business.

For prostitution of minors we have that most magnificent American institution — the Juvenile Court.

THE CHAIRMAN — That is what the State can do. We will now learn "What The Municipality Can Do"; and by going to the South we secured Dr. Powhatan S. Schenck, the Commissioner of Health of the city of Norfolk, Virginia.

State Training School for Girls at Geneva. Drs. Morrow and Bridgeman report that the average number of commitments in this institution is 200 per year, and that 55 per cent. of the entire number are infected with gonorrhea alone, and 75 per cent. with venereal disease.

When we began our work of control of social diseases at Norfolk there were at all times an average of about 250 cases of venereal diseases at St. Helena training Station; to be accurate, when the work was taken up, there were 268 cases at the station under treatment. This number has steadily decreased month by month, until now our average is less than 10. There are about 2,000 men at this station the year round; they are received here, trained and assigned to duty aboard ship, and their places filled with new recruits.

We are well aware that many observers are opposed to reglementation, medical examination, and segregation, and give as their reasons that these methods have been tried in Europe and failed, and further, the recognizing prostitution officially to any extent decreases the morals of the people and encourages prostitution in both male and female. I absolutely disagree with these views. Dr. Wilson, of Philadelphia, who has written up and investigated the subject freely, to my mind takes a very inconsistent and peculiar position. In a paper read at the 1912 session of the American Medical Association he says: "Syphilis and gonorrhea should be put on the list, by all health departments, of the compulsory reportable diseases (New York has already done so to a limited extent): that health officials should carefully and accurately study social diseases, because these investigations to be complete or of any practical value, must be taken up by the health authorities: that free treatment should be given for these diseases by the municipality: quarantine regulations can and should be imposed on all patients and proper treatment given them in order not to endanger the public health." He further advises free wards in all municipal hospitals for these patients; again he advises the systematic education of the public prostitute as to venereal diseases and the dangers to herself and the public. And yet, he winds up his conclusions by opposing municipal control, when all through his article he recommends that can only be

Pneumonia, for example, carries a much higher death rate than tuberculosis, but the economic loss to family, friends and public is much greater from the latter. Poliomyelitis does not carry a high death rate, but its disastrous effects upon its victims is appalling. The direct mortality from gonorrhea and syphilis may not be large, but the trail of the red plague and its evil consequence is worse than war, pestilence or famine.

It would be a gross extravagance of time and energy, and an insult to your intelligence, were I to trepass long upon your patience, preaching the importance of this work and the necessity therefor, when every novice in medicine or public health work knows so well, that this great social evil is eating into the very vitals of the nation, and that people in all walks of life are clamoring for and demanding relief. This is the age of prevention, and, in my opinion there is no valid reason why all other infectious and contagious diseases should be receiving the attention they are, and these, the worst of the lot, relegated to neglect and indifference. In my opinion it is impossible to estimate with any degree of accuracy the baneful effects of gonorrhea and syphilis. The recognition of this fact and the vast importance of the subject is too apparent for argument.

In running over the files of the last forty numbers of the *Journal of the American Medical Association,* I find that out of 360 original articles contributed to that journal on various subjects, 52, or 15 per cent. of the entire number, were upon gonorrhea and syphilis. The *New York Medical Record* for a corresponding period, out of 260 original papers, published 30, or about 12 per cent. upon this subject. In his report for 1911, the surgeon general of the navy said, "Venereal diseases *continue* to be the *most potent factor* of damage to the Naval service; during 1911, 138,183 sick days were caused by venereal diseases alone, and of every 1,000 admissions to the Naval service for the year 1911, 155 were infected with venereal diseases. Of a total enlistment for 1911 of 58,340, over 9,000 had venereal disease in some form, gonorrhea, syphilis or chancroid." The most astonishing and conclusive statistics that I have been able to gather, however, because dependable statistics in these diseases are not available nor reliable, to any great extent, are the figures from the Illinois

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point of view, and health officials are not t
morals of the people. That we can detect
part of the infection is no argument agair
whole; the same argument could be used as a
of infectious and contagious diseases: It w
silly to say that because we cannot entirely
losis, diphtheria, or smallpox, it does no goo
cases that we can reach. Every case we put
is one more focus of infection destroyed.

Whenever a health officer has reason to sus
of an infectious or contagious disease, he investi
the situation, why not in venereal diseases? C
every reason, in *any* house of prostitution to su
close our eyes here, and get busy if we hear of a
mumps or whooping cough?

One of the serious drawbacks to the work is t
getting in touch with clandestine prostitution, stre
live more or less privately in low grade boardin
home; some of them do trifling work during the da
more particularly on prostitution at the night for
try to reach this class of prostitutes through the aid
force who report all assignation houses. We have
surveillance and send an officer there at night at
times, and if there are "ladies waiting for company
them and sends for the medical inspector, who exam
takes names and addresses, and cautions them that if t
present themselves for regular examination and are cau
they will be arrested and punished. Any girl caught
on the streets by the police force is arrested and her hi
vestigated. While this is a hard class of prostitutes to r
inspect regularly, we do not feel that the work is a failure,
means, because we do not control every case. Our late
show that a very large percentage of the cases of infectio
we now find is among the new arrivals in the city.

I believe that we can control syphilis; gonorrhea is a
more frequent disease, much harder to diagnose, less lia
attract the attention of the girl, and when chronic, gives
trouble, per se,— the sequellæ of course are always troubles

bu[illegible] except in very rare cases the girl does not attribute her troubles of this kind to gonorrhea. Then again, the male prostitute is not half so particular with gonorrhea as with syphilis, he is not afraid of his gonorrhea and will often take a chance at sexual intercourse after the acute and subacute stage has passed; with syphilis it is different, he is himself afraid of the disease and its consequences, and he tries to get well.

Our plan of procedure in Norfolk is as follows: First — We require a rigid registration of all prostitutes at the health department, together with a full description of the girl, on blanks printed for that purpose. We keep a card index system of registration both by name and street. We require all landladies or proprietors of brothels to report to the department within twenty-four hours the arrival or departure of all inmates, together with a full description of the girl. The work is divided among four competent physicians, clothed with police authority, who regularly inspect all houses, making careful examination of each inmate. These inspections are made from seven to fourteen days at unannounced times, swabs are made from the cervix, urethra and Bartholinian glands and examined microscopically. The vulva and entire vaginal tract, arms, mouth, throat and anus, in fact, the entire body is carefully examined. Venereal diseases are not only sought for, but all communicable diseases. If tuberculosis is detected, the girl is at once removed from the house; in contagious or infectious diseases of any kind, skin and eye, she is quarantined and her card taken up. If no communicable disease is detected, we give the girl a card good for fourteen days, unless our attention is called to the girl in the interim. The card does not say or guarantee that the girl has no venereal disease, but simply sets forth that she has been examined and that she has complied with the requirements of the health department. Personal hygiene is taught them and made compulsory, the landladies being held jointly responsible for all violations of the rules of the department. If the landlady or inmate refuses or fails to comply with the regulations, she is arrested and the house placarded as the case seems to require. We frequently fine them as high as $50 and costs. Infected girls are quarantined or taken to the hospital or City Home for treatment and held until cured

When a physician or layman reports a cas(and gives us the necessary information, do, we immediately send a physician othe the last examination to investigate the c before mentioned, and follows the course infected cases.

The landladies of all houses are required t spicuous place in every room a card, furnisl ment, bearing the rules and regulations gove titution. Each inmate is required to post he Many of the young-men-about-town who frequ promptly and facetiously ask the girl for her cate," as they term it. The medical inspect make a daily report of all infected cases diagn the name of the girl, residence, and nature of c(girl is infected and put under treatment she n and carefully examined by one of the medical being allowed to resume her trade or granted have we the situation in hand in Norfolk, that y prised to know how acutely the girls watch the da and how anxiously she looks and calls for the insp not come around promptly for the examination. T to see her friend if her card has expired, and she to lose her customer, and she therefore insists up(ness. The medical inspectors also report to each of infection found by them.

The medical inspector issues this card:

"THIS CARD MUST BE POSTED

DATE................

I Certify That .... Has Fully Complied quirements Of The Health Department Of The City Of Norfol This Card Not Good After .... 1913.

.... Medical

When a sailor reports himself at the Station as h bitten by the "love-bug," and he is required by naval this, under penalty of 60 days in the brig on bread and a fine equal to 60 days' pay, the Naval authorities at th send an orderly over with the infected man to the healt ment; we then send an officer and physician with the

the house to identify the woman. She is examined and treated accordingly. In some cases where it is not practicable at the time to give the patient hospital treatment, she is quarantined at the house and her card taken up; she is cautioned not to ply her trade, and if she does so, she is arrested and fined. We have an officer assigned to this work who goes around at night. He has a list of all women infected, and if he finds any out of quarantine, she is arrested.

Some of the good results outside of the detection and treatment of infectious venereal complaints, brought about by our system of inspection and supervision are:

1. The landladies keep their houses and premises in much better sanitary condition than formerly.

2. The inmates are required to and do pay far more attention to personal hygiene in every way than before.

3. The inmates pay more attention to their general health, fearing a temporary quarantine and suspension from business, with the consequent loss financially. Fearing infection themselves, they are in every case exceedingly careful in their examination of all men offering to trade with them. In many houses, the landladies themselves being more expert, insist upon making an examination of their customers.

4. *No new arrival* is permitted to see company until she is examined and granted her card.

5. Landladies are keen on having their inmates treated for any complaints they may have, fearing detention from business, and they will, and do pay for, or advance the necessary money for treatment of their girls; it is a business proposition with them.

6. There is less consumption of intoxicants than formerly, because they have been taught that when intoxicated they are more liable to contract disease by carelessness and negligence.

7. The landladies and inmates are better taken care of in every way now than formerly; surgical operation and treatment is required in all cases when necessary.

8. There is great improvement all around in the general health and tone of the prostitute due to frequent inspection, advice, and the demands of the inspectors.

The medical inspectors are not permitted to treat inmates;

they refer them to their regular physician
if they require free treatment.

As a result of the work in Norfolk, the I
not now permit shore leave to any infected
sailor permitted to frequent or patronize a i

We have been applying to some extent th
these inmates, and while we have not gone
phase of the work as we intend to, we are pe
fifty per cent. of these girls are morons. W
through a committee to take up this questio
oughly, and the probable result will be, where
pronounced morons, we shall either get them b
them to some institution; this work alone will,
potential for great good.

In conclusion, I unhesitatingly say, as a dir
work in Norfolk, and it is generally conceded by
that there is much less venereal infection than t
sicians and social workers concede also that the
improvement; all along the line, in the general h
and sanitary conditions of the segregated district
conditions in which we are particularly interested h
a thousand fold, and if time and space permitted, I
I could give you many additional proofs that the w
a success in Norfolk. It is regarded by all classes of
ministers, social workers, physicians, laymen and th
herself as a work potential for good in divers ways, and
ment of health has, after two years' active work and
keeping in close touch with every phase of the situation,
not only, *not* to abandon the work, but to push it wi
resources at its disposal.

THE CONTROL OF SYPHILIS AND GONORRHEA — WHAT THE MUNICIPALITY CAN DO

By GUY S. KIEFER, M.D.

Health Officer, Detroit, Mich.

You will pardon me, I am sure, if in the course of this discussion of a subject which has been presented by two previous speakers, I repeat to some extent. I will endeavor to do so as little as necessary to bring out my points.

It has been said that the control of syphilis and gonorrhea is a great problem. There is no dispute about that. It is a moral, sociological and medical problem, and to get rid of them altogether we must attack it from the moral side, and this must be accomplished by a campaign of agitation and education. But to meet the conditions as they are, and to prevent the spread of the diseases as they exist, is more nearly a preventable-disease problem such as presents itself in the case of any other communicable disease.

The question as thus presented to me is: What can a municipality do to control these diseases — syphilis and gonorrhea? I have said, that to entirely eradicate them the municipality can enter on a campaign of education, such as described by Dr. Hurty, and this can result in desired legislation, such as a proper marriage law, forbidding the marriage of people afflicted with any of these diseases. There should be a law requiring the reporting of all cases of syphilis and gonorrhea to the department of health; a law requiring the registration of births within twenty-four hours. Most states give a period of ten or twelve days, but to prevent ophthalmia neonatorum they should be reported in not to exceed twenty-four hours. These cases should be reported by the physicians and midwives. Having these laws, if we have public sentiment back of these laws, they will be enforced. But we are not able to compel the enforcement of all laws. It is a fact that we have laws which cannot be enforced through lack of supporting public sentiment. Still, that is no reason for our standing

still. We can enforce in the meantime cert
can enforce the reporting of all cases whic
juvenile courts, the hospitals, etc.

Regarding the reporting of cases among pr
you in detail how that can be done. It can b
track of the prostitute, by our not sticking ou
like the ostrich and saying that all such houses

We must establish laboratories. Most progre
boards of health — certainly State boards of he
tories in connection with their work. But the
pared to do the newer work in the diagnosis o
laboratories should be brought into condition
exact condition of patients suffering from eit
diseases. Then there is the establishment of clin
of sufficient capacity for all cases. It has been s
city hospital should receive these cases. There s
hospitals built by cities for the reception of all c
found suffering from these diseases, just as we
pitals for special diseases.

What I mean by a "clinic" is an institution such
our city; have visiting nurses look up the births
and on that account the cases should be reported e
they could be looked up promptly to see that cases
neonatorum are promptly detected and properly treat
to control communicable diseases it is necessary to ge
it was so of tuberculosis before we had any law requ
port, and it is so since. We sent people around on
campaign to educate the public on the subject of tuber
they would casually learn that there was some one affli
in the house and they would incidentally get them t
clinic.

When I talk of the establishment of clinics and bri
laboratories up-to-date, and the establishment of hospital
requiring of reporting of all these diseases among pros
speak of the method I hope to have in my own city. In
of Detroit we have established a method of examination
tutes, something different from the inspection of them
vals, regular intervals. Our inspections are made at irre

tervals and the times are not announced. The burden of keeping well is put up to the prostitute, and not placed on the city. In that we differ from the methods followed in other cities.

We established a board of health clinic for venereal diseases; and to this cvlinic anyone can go who wants advice in relation to the spread of these diseases and their cure. Many people go there to find out about syphilis, to ascertain if they have it; and they are taught about the spreading of the disease, and incidentally they are given the necessary advice as to the care of their own case if they are suffering from any disease.

So someone may come for instruction. But all of the protitutes in Detroit about whose whereabouts the policemen know, must come to this clinic for examination, and they had to come for a first examination. They all had to go as quickly as possible, in succession, at the time of the establishment of the clinic about one year ago, and they were sent in by the police officials, who know where they are, and they were examined and a record kept of them, and if on the first examination a woman was found to be well, not suffering from either of these diseases, she was told she was then free from disease and that she must keep hersedf free from it in spite of the fact that she was where she would be exposed. She is not given any card to show she is well, and that the board of health says so, but she is given instruction that she is not sick at that time, and must keep well by frequent examination by the most competent and high priced men she can get.

The result is that prostitutes who formerly were examined every two weeks are now being examined every week. Why is that? That is because, if they are told by their own physician that it is found that they have the symptoms of one of these diseases, they must promptly report it to the board of health; and if they do not find out by examination they are diseased, and we find it out and it has not been reported, or if we order them to our clinic at any time, and it is found they are diseased, then the house is placarded if the case had not been reported.

The hospital for all these cases has not yet been completed, but the bids were considered a short time ago, and the money is available, and the hospital will be in use inside of one year. In the meantime, if found diseased under our examination, they are iso-

lated by the order of the police. What doe that they obey instructions and do not sub from contamination by their trade; and whe that control they obey the regulations. A disease is not allowed to expose anyone to th been presented to the board of health clinic tirely recovered. Meanwhile she must und

I will sum up by giving something in the w can perhaps reach your own conclusions abou impossible to give, as we have not the other en predecessor had in the case of the men in th

We have examined during this year 1,045 some of whom have been examined as many as fi of whom have been re-examined only once, and have not been examined since that time. Of the 122, or 11 per cent., were found to be in an in one or other of these diseases. In the case of teriological examination has been made, and in the the Wasserman test has only been made in a f laboratory work is not up to the point as yet where of all this work. But in the case of the 122 foci existed, the 122 different women were kept from during the year; so something has been done there. the visits of the nurses during the last two summers, were visited by the nurses and 26 cases of ophthalmia were found and kept from becoming blind absolutely not have been found in any other way. So if we hav in saving the eyest of 26 babies in two summers, and p infection which 122 women infected with either go syphilis might have spread, then it does seem to me th tion of this kind is worth while.

WHAT THE PHYSICIAN CAN DO TO AID IN THE CONTROL OF VENEREAL DISEASES

By JOHN L. HEFFRON, M.D.

Dean, Syracuse University Medical School

Physicians, in common with all others who are interested in this subject, are under the disadvantage resulting from hundreds of years of misconception and of lethargy concerning these diseases. Promiscuous sexual relations and their consequences have been relegated to morals. It is the great question of morals. The original sin of the theologian, to the scientist is man's animal ancestry. Selfishness and sensuality are the two most damning animal traits that survive in man. Until these shall be eliminated by process of evolution the conditions necessary for the dissemination of venereal diseases shall but gradually decrease. But venereal diseases need not persist.

I. The first step for the physician is to bring his own ideas on venereal diseases up to date. Since the discovery of the specific cause of gonorrhea, syphilis and chancroid, complete knowledge of their nature and their mode of infection has been given to the profession. There has never been any delusion about the diagnosis of gonorrhea, but we were taught, and, until the discovery of the spirochaeta pallida, we taught that an absolute differential diagnosis between chancre and chancroid was not possible and that a diagnosis of syphilis upon the appearance of a venereal sore alone was not just to the patient and that specific treatment should rarely precede the onset of secondary on constitutional symptoms. Modern science has done away with the necessity of delay. A bacteriological test of the secretion, and a Wasserman or Noguchi test on the first appearance of a venereal sore will establish an absolute diagnosis and no physician can be excused from having such diagnostic test made, for within reach of every practitioner is a specially trained bacteriologist who stands ready to make these tests.

These diseases are contagious and they must be classified with contagious diseases and treated as are other contagious diseases.

They are curable. No physician has a
a venereal patient if he has not made him
methods of treatment. He must know how t
stage of gonorrhea. In the old times it was
jective symptoms disappeared, the gonorrhea
we know that there are more gonococci carriers
riers of any other known infection, and that the
dormant, are capable of setting up an acute
given the chance. Therefore every physician s
formation to his patient and insist that he shall
self cured until an examination of the milked
prostate and deep uraethra, after the ingestion o
to the genito-urinary organs, shall be negative.

The best syphilographers agree that Salvarsan a
san cure syphilis. The remedy must be administere
repeated until a negative Wasserman is maintaine
ordinary care has to be exercised in the handling of th
it is not without its dangers. But never before could
that syphilis was curable. It is a great and most si
forward. Salvarsan should be used in primary case
a diagnosis by Wasserman test can be made.

These diseases are preventable. It is a duty to diss
conclusions of the medical officers of our army and na
ing the effect of prophylactic measures in cases of ex
might be thought that the teaching of measures wherel
sequences of an infection can be avoided would encoura
ality, but the experience of the army and navy warran
sions exactly opposite. Their statistics show that since
been educated to appreciate the danger they were run
those exposed have been compelled to undergo a vigorou
lactic treatment, the number of exposures has diminishe

II. Physicians must take venereal diseases out of th
private diseases. A disease which is surely communica
which may easily be transmitted to the innocent is in no se
vate. It affects society and society must assert the right
with it as with all other infectious diseases. In state heal
no exceptions are made of any contagious disease and no
cian can be punished by law for violating the privacy of a

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These diseases are contagious and they must be classified with contagious diseases and treated as are other contagious diseases.

whether he be a druggist, a friend, a quack or a p
no question but that venereal diseases would be
than the 50 per cent. testified to as a result atta
by those communities which have already secured
tion of a law compelling notification. On May
went into effect in the city of New York regulatio
all public institutions to report every case of vener
"requesting" physicians to report cases in private p
a way as to protect the identity of the individual.
partment at the same time offered free of charge to
ing, bacterial diagnoses and Wasserman and Nog
syphilis and agreed to administer vaccines and Salv
letter dated November 25, 1912, Dr. Lederle, the
of health of New York city, writes me that from May
ber 13 there have been reported from all the borou
York 1,984 cases of syphilis, 2,164 cases of gonorrhe
of chancroid, giving a total of 4,414 cases of venereal
which 3,628 are reported from the borough of Manha
proportion of syphilis to the other venereal diseases rep
indicate that there is not yet a general response, if an
the "request" for physicians to report private cases.
compulsory report from all public and charitable and
stitutions is of very great value.

III. Physicians must consider these diseases as amo
most serious infections with which they are called upon
In the past there has been a tendency to consider them as m
cidents in the careers of adolescents and young adults. Go
has been flippantly compared to a simple cold. Those wh
a specialty of these diseases were considered little better tha
patients.

Unfortunately these infections do not result in early fa
nor do their early manifestations make impossible attent
business and to social duties. But the knowledge of their
mate serious and often fatal results to the individual and to
innocently infected by them has piled up, so that to-day ven
diseases are known to be responsible for the ultimate loss of
lives and for more mental and physical crippling than any o
infection.

IV. Physicians should favor the treatment in dispensaries of the many who find it impossible to consult a private physician. For this service the opening of the dispensary clinic for venereal diseases in the evening and on Sunday has proved of great effect in those cities in which it has been carried out. Such a clinic should be supported by the city for economic causes. Hospital care for these patients should be provided. At present these cases are excluded from all general hospitals. Accommodations for these venereal diseases should be furnished by every city, and patients who are careless and ignorant should be compelled to remain under hospital treatment until they are in such condition as to be unable to transmit their infection.

V. The physician should pay attention to the pathological condition of organs adjacent to or part of the genito-urinary system. Hemorrhoids, ulcers of the rectum, a mild irritation of the bladder from highly acid urine, phimosis, pruritus and other irritating conditions cause repeated engorgement of the penis or clitoris and incite to venery.

VI. Physicians have always been foremost in the education of the public in the prevention of disease. That is their first duty. Venereal diseases have hitherto been avoided. There is no more hopeful sign pointing to an improved social condition than the fact that these diseases have been taken from the subjects which are tabooed by society and are now treated openly. There is no good reason why the discussion of these infections should be avoided. They are with us, they threaten the lives and the vitality and even the perpetuity of the nation. Probably physicians can aid the most in controlling these diseases by right teaching. They should teach correctly and reverently the science of reproduction. They should inveigh against sensuality. They should counteract the false teaching that sexual indulgence is necessary to health of body and of mind. They should teach the whole people concerning the nature of venereal infections and should tell exactly what are the awful consequences of syphilis and of gonorrhea. There is no class of citizens who can contribute more to aid in the control of venereal diseases than the physicians. But they must have an aroused community behind them and the support of those who administer the law. Without the co-operation of those who know most inti-

mately the evils, the dangers and the fatal
of those who are devoted to the well-being
and of those who take charge of the int
over which they preside, nothing of perma

In closing let me repeat the noble sentim
good is to be done, duty only ceases when tl
to do more or to do better."

DISCUSSION

DR. H. B. BESEMER (Ithaca)— I find I a
apprehension. The occasion of my being he
paper on gonorrhea at Buffalo a few months a
to be here to define my position. And to make
lesson your Chairman suggested that reprints o
I read at Buffalo be distributed here. The rep
distribution, and that paper sets forth all the poin
or could make in relation to the fundamental ide

With the main statements of the other speakers
accord; and inasmuch as it is now past lunch-tim
three or four other people to follow me, I will sir
you will take one of the printed copies of the pan
read on "Gonorrhea and Syphilis" you will have

DR. ELIZABETH H. MUNCIE (Brooklyn)— This
altogether, as it always has seemed to be, a woman q
the truth of the matter is, it is a man's question; an
been a man's question. There must be women and gi
the demand; and there must be men to create the d

Prostitution is a habit — not a necessity; and until
do away with that everlasting lie of "physical necessity
not touch or strike at rock-bottom of prostitution and its

As I said before, it is a man question, therefore we n
pressure to bear on the man and not the woman, for th
cannot have anything to do directly with the communi
the disease to an entirely innocent person. Yes, every
and proposing male prostitute should be examined to pr
prostitute. If she must exist, it is high time that she w
tected. It seems to me that in this matter Truth is ever
balance, Error ever on the throne.

How ridiculous!— I do not care what the results may be
certain conditions — how ridiculous! to give a woman in a
of prostitution a certificate of health this minute when
twenty-four hours have passed, she has served from four to

men. How many of these four to forty men have carried to her the virus of either one or the other of these diseases? In New York City there are 20,000 prostitutes and 225,000 venereally diseased men. That is a small estimate when you consider the extent of this problem. You would have to examine her after every man she has cohabited with, and then you could hardly keep her clean. Therefore, how it can be brought about soon and practicably is not for me to tell you — I am only dealing with principles;— but the conclusion of the whole matter is that every man should be examined by a competent physician before he should be allowed to go to a prostitute.

Of course, I am now granting that prostitution is necessary; it is here and will be here as long as men demand it; and men will demand it so long as the abominable prudery exists of which Dr. Hurty spoke. But let us get down to causes, and not deal everlastingly with effects.

Let the public be protected by making venereal diseases reportable, as all other contagious diseases are. But, you will say, " These laws will not be obeyed or carried out." I reply, " Nor are the laws against stealing and murder." You say, " It is costly." Of course it will be costly to have competent physicians to examine them; but not as costly as having one-fifth of the United States Army or Navy laid aside, which in the case of the Navy is equal to the suspension of three great battleships for a whole month in the year, each having a complement of 1,000, officers and men.

Speaking now of preventive measures, we come to surgery. After a man has had an attack of gonorrhea and it has become contagious, and that strange little organ spoken of in Gray's Anatomy and other anatomies, that little accumulation of many little glands and sensitive nerve terminals which is called the uterus masculinus, situated in the prostate gland, when that becomes inflamed a man often becomes only a sensual animal and control is almost impossible. Again, physical irritations, such as adherent foreskins, requiring circumcision, and hemorrhoids calling for removal, are all the time registering their call upon the brain cells and interfering with his controlling energy.

There should be sterilization of all sensualists by castration or vasectomy.

Last, but not least, decrease the demand. The supply now is rather a case of commercialized conditions.

We then must vigorously attack the " White Slavery " question, first. Second, the sterilization of the sensualists. Third, the reporting of venereal diseases. Fourth, demanding a certifi-

cate at marriage. Fifth, the most impo
sex education of the coming generation.
home — just as all sacred things should
but we may not count on it there every tin
have compulsory sex education for the c
careful of the teachers of sex hygiene; ther
all over the country claiming to teach se
nothing about the subject save the perversi
know and teach the children that every nor
is not to be a sexless man or a sexless woman,
controlling individual. Sexuality controlled
achieves all that has ever been achieved in thi
uncontrolled becomes sensuality; becomes a
which is highest and best, and grovels in the
rottenness and destruction. Its perversion is a
and in proportion as men and women control
sexual force, in that proportion will they be a p
and command success in whatever is undertake

THE CHAIRMAN — This concludes our program for the
ence stands adjourned to meet here to-morrow morning at

Thursday Morning, December 5 — Session for City Health Officers

SUPERVISION OF FOOD SUPPLIES — EDIBLES

By F. B. PARKE, M.D.

Elmira

Lippincott's Medical Dictionary defines the word edible as meaning "things fit to eat; eatable." We find many things eatable but not fit to eat. Hence, I assume Commissioner Porter has assigned this subject as one which will bear discussion at this time.

It is not necessary for me to enter into detail in this short paper the various causes which may render unfit for human consumption the different articles of food which are placed in the markets for such use, therefore, I shall briefly summarize what is being done in Elmira for the protection of the public.

Our first crusade toward the supervision of food supplies began three years ago, when we had introduced into our sanitary code this article:

Article 21, section 3. No fruit, vegetables or other produce or foodstuff, intended for human food, shall be exposed, kept or maintained on streets of the city of Elmira, N. Y., from May 1st to September 30th, of each and every year unless such fruit, vegetables or produce are enclosed within a dustproof glass case or otherwise adequately covered. No meat intended for human food shall be kept or exposed anywhere within the city of Elmira, N. Y., except that it is kept and maintained within a cooler or other enclosure or is adequately covered to protect it from dust, dirt, flies and other insects. Any person or persons violating the foregoing section shall be liable to a penalty to be recovered by the city of Elmira of ten dollars, and shall be liable to be punished according to the provisions of the Penal Laws of the State of New York.

At the same time an ordinance was adopted, "That no article intended to be used as food shall be exposed or displayed in any street or way, or in front of any place of business, unless the

bottom of the box or other receptacle contai raised at least twenty-four inches above the or landing upon which such receptacle rests."

A copy of these ordinances was published in and also served individually on every dealer in structions that this was to take effect immediat

Some difficulty was experienced during the fi of the grocers hesitated to cover, or remove th the display platforms which had been erected stores. However, by the constant vigilance of spectors, together with the public approval of the obstacles have been removed, and now, instead being exposed to dust, flies, etc., they are gener the stores and properly screened or otherwise prot tamination. Some fruit venders still maintain ou but the fruits are kept properly covered, or screen

On July 9, 1912, the board of health adopted code, which became effective August 1, 1912, cont lowing sections in addition to the ones previously r

ARTICLE XXVII. PROTECTION OF FOODS

Section 1. Whereas, the exposure of foodstuffs insects and animals is liable to infect and corrupt su it is hereby ordered that meat, poultry, game, fish, se or preserved fruits, dates, figs, cherries, grapes, berri cut melons, cracked nuts or nut meats, candies, map fectionery, or bakers' products shall not be kept, so for sale in or near an open window or doorway, outsi ing or in any street, private way, or public place o Elmira unless so covered or screened as to be protect and flies or from contact with animals.

Meats or other products, as named above, shall nc through any street, private way, or public place unl protected or screened from dust and flies. Every p the occupant or lessee of any room, stall, building, or any meat, poultry, game, fish, sea food, milk, vegeta fruit, confectionery, bakers' products, or other articl for human food shall be kept stored, sold, or offered fo maintain such room, stall, building, or place and its ap in a clean and wholesome condition. Every peddler o from wagons or carts, in addition to the covering or

vided for in this regulation, shall keep in his wagon or cart a suitable receptacle for the wastes of his business, such wastes to be disposed of in a manner that shall not create a nuisance.

No person or corporation, individually or by his agents, servants or employes, shall transport meat or poultry of any description through the public streets or ways of the city of Elmira except in wagons or vehicles which have been thoroughly washed at least once in every twenty-four hours.

Section 2. All meats delivered by producers for sale in this city of Elmira shall be properly covered with clean material.

In the enforcement of these ordinances, besides having the hearty co-operation of the press, which has been of inestimable service, there has been formed a committee of ladies from the Elmira Federation for Social Service, called the Consumers' League Committee, whose activities have been of value, especially in an educational way, and in bringing violations to the attention of the health department.

By reason of a resolution of the common council of the city of Elmira, adopted October 21, 1907, and becoming a part of the penal ordinances of the city, authority was given for the inspection of all meat, poultry, or fish which had not been previously inspected by the U. S. Government. This ordinance was not enforced until August 22, 1911, at which time the health department established a meat and vegetable inspection station, with the city meat and milk inspector in charge. The board of health adopted this section in its sanitary code:

Section 3. No person, firm or corporation shall sell or offer for sale within the city of Elmira any meat or poultry unless the same has been previously inspected by the United States government inspector or the meat inspector of the city of Elmira; and all meat and poultry inspected by the city inspector shall be stamped or marked by him with an official stamp containing the words "Inspected by Elmira meat inspector" together with the date of such inspection. For the purpose of such inspection the said inspector shall be at his office daily between the hours of 7 and 10 A. M.

Section 4. All hucksters, or persons peddling fruit, vegetables or other foodstuffs from wagons, must have their wares inspected at the meat station daily, between the hours of 7 A. M. and 10 A. M. Violation of this ordinance punishable by a fine of not less than $5.

ARTICLE XXIII. MEAT INSP

Section 1. No carcasses which have had
to being brought in to the city will be admit
casses have all the viscera by their natural at
stomach, urinary bladder, and intestines.

As this move was thought to be somewha
it was deemed advisable to go about it wi
as possible, therefore, a vacant lot in the
city was secured at an annual rental of o
On this lot a portable building, or shed was e
age of thirty-five feet, and one hundred feet
was made at the right of the entrance, ext
building with exit in the rear. On the left
platform, eight inches high, was erected, up
a strong table sixteen feet long, and the additi
by a rack holding meat hooks sufficient to acco
sary hanging of carcasses for inspection. A
part of the building was enclosed for the offi
The installation of natural gas for the heatin
for the purpose of heating water for cleaning,
electric lights, completed the immediate nee
with its equipment cost a little less than six h

Fortunately, our meat and milk inspector h
and meat dealer for twenty years previous t
playment, and has had but little difficulty
detecting diseased conditions. Should any
to the correctness of his judgment, a veterinari
cide. In the case of condemnation of a carc
the loss is generally sustained by the butch
to the market, confirmation by a competent vete
demanded. All carcasses condemned are give
works, located outside the city, for destruction.

A large tightly covered barrel is used to hol
as livers, tongues, chickens, etc., which is rem
same concern. By extreme cleanliness in keepi
from blood, and the prompt removal of all
but little trouble has been experienced from the

That this experiment has become a fixture

Meat Inspection Station, City of Elmira. Exterior

Meat Inspection Station, City of Elmira — Interior.

established. No single measure taken by the Health Department for the supervision of food supplies has met with such hearty approval by the public. It was feared that local butchers and farmers might be unfavorable to the requirements, as they were at first, but now the reverse is true as they find a better market, and a more ready sale for their product, when stamped with the approval of the Elmira meat and milk inspector.

THE CONTROL OF A M

F. M. MEADER, M

City Bacteriologist, Syracuse, and Assistant P
Syracuse Medical Coll

The food supply of a city to-day is dra of the world; our oranges and bananas c fish and mollusks from distant seas, our orient, our meats from various parts of th tables and dairy products, however, come farms. All of these foods are under more trol in order to protect the public health.

It is my purpose to single out milk and receive special attention, and to inquire how controlled, so as to be least burdensome to tailer, and yet be reasonably sure that our Furthermore, the system should not involve t in an excessive amount of administration.

The milk industry in our country is of va the United States there is consumed daily .6 o Two and one-half billion quarts of milk are in this country, and seven and one-half billio in the manufacture of butter and cheese.

Milk is the only food of animal origin cons is the most difficult of all foods to deliver sumer, and when we find that more sickness is milk than to any other food, we have abundant r on the part of the health authorities. But it public officials should not differentiate between products any more than it should the productions occupations and professions. In other words, declare than one dairyman has better milk than an than it should declare that one doctor or lawy services than another doctor or lawyer. There this argument. Doctors and lawyers are oblige certain standard of proficiency before being allow their art. When such a standard is attained a

given, if the conditions stated in the certificate are not obeyed they are discriminated against and may be deprived of it. Likewise, certain standards for milk may be established, if these standards are not observed, discrimination must be observed in well regulated communities. In the instance of the doctors and lawyers it is the state that issues the licenses; in the matter of milk the local health department must be the guardian.

In the milk industry there are certain economic laws which, if fostered, will help greatly in controlling the milk problem. One is, good milk requires considerable capital for its production and hence requires a good price. Poor milk can be made cheaply and hence sells for less price. It is folly to suppose that a producer is going to build up an expensive dairy if he has to compete, solely on a price basis, with a producer who invests little capital and produces poor milk. Unfortunately, the difference between good and bad milk is not always apparent at the time of purchase. It is an opaque white liquid. One sample may contain 4.5 per cent. of butter fat, have but a few bacteria, be sealed in a sterile bottle, have had no possible opportunity to become infected by a person with an infectious disease; while another kind of milk may be from inferior cows on low feed, have 2.5 per cent. fat, kept in dirty barns, contain myriads of bacteria, be sealed in a bottle stolen or taken from an ash heap, and may have been exposed to an infectious disease. At the time of purchase the two samples may look alike — the same white opaque liquid. No one would hesitate which to buy if he knew which was the better — no matter what the price might be. It is this lack of knowledge of the difference in quality of milk that makes the confusion on the part of the public, and lack of interest on the part of the producer.

This is the strategic point at which a health bureau may give assistance. Find out which is the best milk, and let the public know about it. The question of price and the quality of milk will adjust itself.

Milk is used in the household in one or more of three ways. It is given as food to young children. It is drunk by adults, or it is used in cooking. In the first two methods it is used in a raw state, in the latter it is heated and is thus rendered safe. The

baby needs a milk of fairly constant chemi free of all infectious material. The second some and free from infectious material. T proper food values, and if cooked, will be are three standards of milk that might well be

In cities where this matter has received se in general outlines, is the plan in force. I sh cally the system used in Syracuse because, in the system with which I am the most famil is a system which grew out of many conferenc dairymen, retailers, and physicians in this sec We had also expert advice from Prof. H. W. University, and Prof. M. J. Rosenau, of Harva

Our city sanitary code specifies certified a and requires a certain standard of fat and ordinary milk and cream, so that all that was utilize the standards already in force and system of classification we desired so long as it city code.

The following are our standards:

CLASSES OF MILK

CERTIFIED MILK

Certified monthly by the milk commission Medical Society, so long as the production an requirements approved by the American Associ Milk Commissions. Health of attendants at farm medical inspection. Herds under weekly veterin tuberculin tested yearly. Dairy score 98 to 1 duced under conditions as sterile as practicable. special bacteriological and chemical analysis. Proteids, 3 to 4 per cent.; fat, 3.5 to 4.5 per cent per cent.; sp. gr., 1.029 to 1.034; bacteria under 1 milk cooled, sealed in sterile bottles, dated, packe farm, and delivered packed in ice.

INSPECTED MILK

Herds tuberculin tested. Dairy score 90 or abov once per month. Butter fat above 3.5 per cent.;

under 50,000 per c. c.; milk delivered at temperature of 50 degrees or below.

MARKET MILK

Herds not tuberculin tested; dairy score 65 or above; scored once per year. Fat, 3 per cent. or above. Bacterial count under 250,000. If pasteurized milk, bacterial count under 50,000.

Scores are determined on the following basis: Veterinarian's score; dairy inspector's score; milk inspector's score; laboratory score; and are classified as follows: Class A, score 78 to 90; class B, score 70 to 77; class C, score 65 to 69; class D, score below 65.

The system requires a score to cover the production and distribution of milk at each step of the way from producer to consumer. When a producer wishes to have his milk sold in Syracuse, he makes application for an inspection. Immediately a veterinarian and a dairy inspector visit the farm and score the place according to the following score card:

VETERINARIAN'S SCORE

Date..................
Producer................................ Phone..............
Address..
Total number of Cows..
Number Milking..
Number not Milking....................Cause..................
Number Tuberculin Tested.................Date.................
General Condition { Coat.......................................
Flesh.......................................
Attitude....................................
Respiratory System —
Cough ....
Respiration ....
Percussion ....
Auscultation ....
Lymphatic System..
Udder ....
Animal has symptoms suspicious of.............................
Remarks ....
....
....
Rating of Herd — Excellent, Good, Fair, Poor
Signed .... Veterinarian.

Excellent means 95, good means 85, fair means 75, and poor means 65.

The dairy inspector's score card is likewise made out, and put on file.

DAIRY SCORE CA

CITY OF SYRACUSE, DEPARTMENT OF PUBLIC S
MILK INSPECTION

Owner of farm................................
Address ....
Lessee or manager of farm...................
Address ....
Total No. of cows.....................No. mil
Quarts of milk produced daily.........Sold at
If shipped to a dealer give name and address...
Farm No........................ Date of in

	Score	
	Perfect	All
Cows		
Condition (5).........................	....	......
Health (8)........................	13	......
Cleanliness........................	5	......
Water supply......................	5–23	......
Stables		
Construction......................	5	......
Cleanliness........................	5	......
Light.............................	5	......
Ventilation.......................	4	......
Cubic space per cow...............	3	......
Removal of manure.................	3	......
Stable yard.......................	2–27	......
Milk House		
Construction......................	4	......
Equipment.........................	9	......
Cleanliness of milk house..........	4	......
Care and cleanliness of utensils.......	5	......
Water supply......................	5–27	......
Milking		
Suits and washing outfit............	3	......
Care of the Milk		
Prompt and efficient cooling.........	5	......
Abundant supply of ice............	10	......
Protection during transportation.....	5–23	......
Total score...................	100	......

Sanitary conditions are — Excellent......Good......Fair.....
Suggestions by inspector...................................
....
(Signed)...................... ....

When a person wishes to retail milk in the city he first applies for a license. The milk inspector visits his place, examines his milk house and scores his equipment. If satisfactory, a license is issued upon the payment of five dollars.

FORM OF LICENSE

City of Syracuse

DEPARTMENT OF PUBLIC SAFETY, BUREAU OF HEALTH

SYRACUSE, N. Y.,........ 191

To the Commissioner of Public Safety:

I herewith make application for a License to sell Milk and Cream within the corporate limits of the City of Syracuse according to the Sanitary Code and Health Ordinance, which reads as follows:

Sec. 9. Sale of Milk and Cream.— The following regulations are established in regard to the sale of milk and cream:

Subd. C. Application for Milk and Cream License.— Every person applying for such license shall do so upon a blank furnished by the Commissioner; said applicant shall state his name, residence and the location of the farm or other place where his cows, or the cows from which he obtains his milk or cream are kept or maintained; and the name and residence of any person or persons from whom the applicant shall at the time be obtaining milk or cream to be sold within the city, and such other information relating to the source of supply and the quality of milk or cream to be sold as the commissioner or health officer may require; and such applicant, if a license be granted, and within twenty-four hours from the time that he begins to obtain his milk or cream from a new source shall report to the commissioner in writing the name of the person from whom he obtains milk or cream, other than the one named in the application.

PENALTIES AND REPEALS

Sec. 11. Penalties. Subd. A.— Any preson violating the provisions of these ordinances shall be guilty of a misdemeanor and be liable to a fine not exceeding one hundred and fifty dollars or to imprisonment in the penitentiary of the county of Onondaga not exceeding one hundred and fifty days or to both such fine and penalty; or to pay the city of Syracuse a penalty not exceeding five hundred dollars, to be recovered in a civil action.

Producers from whom Milk and Cream is obtained:

Name.................... Address..... .... Score..........

....

....

Number of wagon?..

Condition of wagon?...

How often are wagons cleaned?...

Is milk and cream iced?...

Is milk and cream bottled?..

Where is milk and cream bottled?..

Are night's and morning's milk mixed?.....................................

Where is milk and cream stored?...

Section of city in which milk and cream is sold?..........................

I hereby affirm that the information herein given is to the best of my knowledge and belief true.

....
Applicant

Veterinarian's Report........... Residence..............................

Dairy Inspector's Report........ Approved

Milk Inspector's Report......... ....
Health Officer

The milk inspector secures off the wagon of each retailer about half a pint of milk or cream at least once each month. The

character and condition of the outfit i
milk inspector's score card.) Note is
perature of the milk, character and cl
containers. A score is also placed o
the milk.

MILK INSPECTOR'S

Peddler...
Producer A...
B...
C...
D...
E...

TOTAL SCORE	Method of handling milk	MILK HOUSE					CONTAI	
		Water	Cleanliness	Equipment	Construction	Location	Can	I

Quantity of milk or cream sold per day...
Remarks:

The milk is brought to the laborato
No information is given until the repor
In the laboratory the milk is examin
and total solids. The names of the pr
written opposite each report. The recc
on to a daily report blank.

The records are then recorded on the p
also on the retailer's report card.

BUREAU OF HEALTH — DIVISION OF MILK INSPECTION

DAILY REPORT BLANK

For interpretation of score see footnote

Date.............................

Number of samples	Peddler	Class	Quarter of city	Veterinarian's score	Dairy score	Milk inspector's score	Bacterial count	Dirt	Sp. Gr.	Fat	Total solids	Farm number	Producer	Total score

LABORATORY SCORE

Bacterial count		Pasteurised milk				Fat		Total solids		Cream, bacterial count		Fat	
Raw milk under 10,000	100	Under 10,000	100	No dirt	100	4 and above	100	13 and above	100	Under 250,000	100	40%	100
10,000 to 50,000	90	10,000 to 30,000	90			3.5 to 3.9	75	12 to 12.9	75	250,000 to 500,000	75	35 to 39%	90
50,000 to 150,000	75	30,000 to 50,000	75			3 to 3.4	50	11.5 to 11.9	50	Above 500,000	0	30 to 34%	75
150,000 to 250,000	50	Above 50,000	0			Below 3	0	Below 11.5	0			25 to 29%	50
Above 250,000	0											18 to 24%	25
												Below 18%	0

PRODUCER'S CARD

Producer................................ **Address**.. **Farm number**..................

Date	Peddler	Vet. score	Dairy score	Temp.	Wagon	Milk house	Con-tainer	Bacterial count	Dirt score	Sp. Gr.	Fat	Total solids	Total score	Peddler
														A
														B
														C

RETAILER'S CARD

PEDDLER........................ ADDRESS.................... PHONE NO.................... QUARTER OF CITY................

DATE	Pro-ducer	Vet. score	Dairy score	Temp.	Wagon	Con-tainer	Milk house	Bacterial count	Dirt score	Sp. Gr.	Total solids	Fat	Total score	Producers
														A
														B
														C
														D
	Infectious Disease and Address							Date						Date

These cards are kept on file so that a complete record is at once available for each producer and retailer. At the end of each three months the record is averaged and the class of milk determined according to the score attained. A statement is sent to each producer and retailer and the weak points in the care or quality of his milk are indicated. Following is a sample of letter recently issued:

THIS CLASSIFICATION HOLDS UNTIL JANUARY 1, 1913

Syracuse, N. Y., October 1, 1912.

DEAR SIR: According to our records your milk for the last three months entitles it to be ranked in Class —.

Your record has been low on the items indicated by a check mark with a pen, otherwise the records are excellent.

Veterinarian's score, dairy inspector's score, retailer's milk house, retailer's wagon, condition of bottles or cans, temperature, bacterial score, dirt score, fat score, total solids.

Respectfully,

.......................,

Chief of Division of Milk Inspection

For the benefit of the public, a list of those selling certified, inspected, and "class A" milk is kept at the office. The section of the city in which the retailer sells milk is also noted so that when a person inquires at the laboratory for a good milk producer, we inquire what the milk is desired for; then we give the names of the retailers selling in that section of the city.

On the side of public health, when an infectious disease is reported, an inspector inquires about the milk supply. This is at once reported at the office and recorded on the producer's and retailer's card. Also a colored pin (red for scarlet fever, blue for diphtheria, etc.), is put on a bulletin board opposite the retailer's name. At the same time on a calendar, a note is made two weeks ahead, to remove this pin. When three or more pins accumulate on a retailer's name the health officer is at once notified, and an inspector is dispatched to investigate the source of the milk, and determine if possible any common source of infection.

The advantages of this system may be summarized as follows:

1. Each person receives credit for just what he does to improve his milk. The careful man is accorded recognition. His name is placed on a list for inquirers to consult. The man who is indifferent is ignored, and when his customers complain, they are referred to retailers who have a better grade of milk.

2. The quality of the milk is determined and the records are at once available, for the party concerned and others interested.

3. Producers know where to find a list of good retailers and retailers know where to find a list of good producers.

4. The veterinarians and dairy inspector know where good cattle are for sale. So that they are of great assistance to purchasers, in advising where good cows may be bought. The advantage is mutual to both buyers and sellers.

5. Infectious diseases are at once detected before they gain headway.

The disadvantages of the system may be summarized as follows:

1. The system does not give the publicity that would make it most effective. A quarterly publication of the names of the retailers selling certified, inspected, and "class A" milk would be of great value to the public and to the careful producer.

2. Good producers often suffer from the carelessness of their retailers, and vice versa, by receiving a low score through no fault of their own. This is a matter which will tend to adjust itself more and more. The good producers are going to seek good retailers, and good retailers will insert in their contracts specifications which will require standard products from the producer.

The system so far this year has resulted in the delivery of cleaner and richer milk to the consumers of this city than ever before. However, the best system ever invented will never bring results unless it is executed by an efficient staff of workers. We are proud of the vigilant, careful, conscientious work of the Chief of the Division of Milk Inspection, Mr. George Hannett, and the able and judicious Dairy Inspector, Mr. James Lees. To these men more than to any system may be attributed our happy results.

SUPERVISION OF WATER SUPI

BY THEODORE HORTON, (

Chief Engineer, State Department

The preservation of water supplies invol
of precautionary measures:

1. Protective measures for the purpose o
pollution.

2. Corrective measures for the purpose c
ing the effect of pollution when once it h
supply.

Each of these measures has its limited s
pending upon the extent to which the raw w
menaced by, contaminating influences. Ob
ply is derived from a stream, or spring, or
tically uninhabited watershed, its artificia
unnecessary, and protective measures only
on the other hand, a water supply is taken
which there is a considerable resident p
contribute pollution directly or indirectly
ures would obviously be necessary through
purification. Between these two extremes
of conditions involving intensity of polluti
protective or corrective measures on the o
careful differentiation in order to solve a
and my theme this morning will be along
the requirements, limitations and applica
and corrective measures in safeguarding
plies.

There are in this state some 450 publ
and operated by municipalities or privat
these some 250 may be classified as surfa
from streams, ponds or lakes), and the r
may be classified as ground water supp
wells. Some of these supplies are deriv
watersheds where little or no contaminati

are so situated as to receive only indirect contamination, i. e., contamination which does not enter the stream directly, but is partially purified by flowing over land or filtering through soil. Still others are situated as to receive direct contamination, i. e., discharge directly into the water supply without receiving the natural partial purification referred to above, but under such favorable conditions as to dilution, sedimentation and time interval elapsing before its use by consumers, that the water can be made safe by water purification. Finally, we have supplies derived from large streams or bodies of water which receive direct contamination in such gross amounts and in such close proximity to water supply intakes that in addition to water purification a treatment of the sewage is necessary.

We thus see that the question of water preservation is one inseparably linked with that of stream pollution and sewage purification. Before the question can be answered in any particular case the sanitarian must first be able to determine at what point along the scale of danger to health, as measured by intensity of pollution, the case falls. He must then be able to determine where along his scale of corrective measures, as gauged by the efficiency of his purification process, the particular type of plant or combination of plans may be found which will effectually remove the pollution and render the water safe.

The determination of the correct points on these two scales is rarely a simple matter. It is often very difficult and occasionally indeterminate, involving a scientific knowledge of bacteriology and epidemiology with reference to the one scale, and an engineering knowledge of the art of water and sewage purification with reference to the other. We know that disease is transmitted only through the agencies of specific micro-organisms. We know also that a water may be grossly polluted with certain classes of organic matter, discolored by vegetation and roiled with suspended particles of silt and sand, and, with all, be free from specific germs of disease. Furthermore that water may be clear and sparkling in appearance and yet be laden with these invisible germs capable of transmitting disease. In other words, we must differentiate sharply at the outset between the esthetic and the dangerous, and

here fundamental principles and teaching ing must be closely adhered to.

These principles are fortunately well est on practical experience, and our rules are f know for instance that disease germs are p disease germ responsible for a case of dise the body of another victim. The corollary clude from our water the wastes and was which may contain these germs we can ha to drink even though it be unpleasant in ap In brief, it is the human pollution, and th sential to keep out of a water supply to ma prime consideration, and all others, such esthetic qualities of the supply, are secon that esthetic qualities, such as freedom fr taste, are not of some importance but I do as of secondary importance when health a

In practice, then, our rule in the preser is primarily to render these supplies h from human pollution — and secondarily, dentally obtained, free from objectionable stroy their esthetic or wholesome charact ideal, sanitary quality can be obtained which is uninhabited. This, however, is aim should be to obtain this standard as n practice this involves, for instance, the se shed, where it is economically possible t patrol, a strip of land or a zone, as we call courses, within which certain sanitary re fully observed. Cesspools and vaults, whi danger class, must be kept outside of this that no human excreta can overflow upon the stream. Garbage and manure rank se on account of the possible presence of disea and, in the case of manure, to the careless of using it as a repository for human excre be stored in proper receptacles or pits and land outside of the restricted zone. Chic

rank last in the danger list, and it is on esthetic grounds only that these sources of pollution should be kept well back from water courses.

By the application of such simple precautionary measures and a strict sanitary patrol it is usually possible to protect surface water supplies to such a degree as will preclude any serious danger of infection of the water supply. Such measures, however, are applicable only to comparatively small watersheds where the resident population is sparse and the sanitary patrol easy. On many of the larger watersheds and especially our larger rivers, along the banks of which are communities discharging sewage into them, these precautionary measures are difficult to carry out and our sanitary patrol becomes ineffective and impracticable. In such cases corrective measures only can be relied upon, and very fortunately the art of water filtration has developed to so high a point of efficiency that it can, in most cases, be relied upon to render the water safe. In some instances water filtration alone may be insufficient, and it may be necessary to supplement or reinforce it, as it were, by means of sterilization. Other instances may be met with where both these processes would prove insufficient, in which cases there would be required in addition to water purification, a treatment of the sewage.

It is here that we pass from the field of water purification to the field of sewage disposal, and as we enter this field, we find an array of purification processes of varying efficiencies by which our scale of corrective measures may be still further subdivided. These processes range from mere clarification of sewage by such means as sedimentation, to almost complete purification of sewage by means of combined processes of sedimentation, filtration and disinfection.

It must be evident, therefore, that through the judicious application of either protective or corrective measures, the adequate preservation of surface water supplies is always a possibility. It must be frankly admitted, however, that some cases present complexities that are difficult to unravel; and it seems almost irony of fate that the most difficult of questions to solve in this respect is the one that most frequently arises, viz.: that of determin-

ing when *protective* measures are insufficient and *corrective* measures become necessary; a question which is always of considerable importance owing to the comparatively high cost of purification processes. When the line has once been crossed, however, the question becomes simplified, owing, on the one hand, to our rather definite knowledge of the efficiencies and limitations of purification processes; and, on the other, to the relatively small increments in cost incurred by supplementary processes.

Turning now from the surface water to the ground water supplies, we find at once a simplification, owing largely to the fact that the preservation of ground water supplies is limited largely, if not almost entirely, to protective measures, and not to corrective measures. I mean by this that our ground waters, whether from springs or wells, come to us already purified by percolation through the soil, and for practical and scientific reasons, it is not customary to attempt a second purification by artificial means.

If a spring or well is so situated with respect to polluting sources as to furnish a water which is *unsafe,* we have in general to face only the equation of how this source of pollution may be removed, or the well so *protected* as to prevent the pollution from entering. In other words, the question of filtration or other corrective measures does not arise, although I say this guardedly in view of the possible applicability, in some instances, of hypochlorite treatment.

Fortunately, most springs are situated in isolated places, and their protection against pollution is a comparatively simple matter. Tight walls enclosing the spring and carried well above the surface of the ground, with embankments to shed water away from it, drainage ditches above to deflect surface water; tight covers and guard fences to prevent access by people and cattle, are among the more important means of protecting a spring supply which is not subject to underground pollution.

If, however, there is a resident population on the watershed which might contribute pollution from underground sources, such as cesspools and vaults, the problem of protection becomes somewhat more complex, though rarely serious except in certain geological formations. Here it will be necessary to keep these struc-

tures at a safe distance from the springs, giving due consideration to the geological formation and character of the soil with respect to the purification of this pollution before it reaches the spring. In gauging this requirement we must keep in mind that sandy soil is most effective in purifying such pollution; that clay soils are less efficient as a filtering medium, owing to fineness of material and difficulty of permitting oxygen of air, or that dissolved in ground water, to pass freely through it; that gravel soils are frequently treacherous owing to their great porosity; and that certain rock formations are also treacherous owing to fissures or eroded channels which allow pollution to flow through them without appreciable purification.

Without being too specific, however, we may say that in practice it is the surface pollution which in most cases menaces a spring supply, and that if underground sources of pollution are kept at a safe distance, and the spring is thoroughly protected from surface pollution, there will generally be little if any danger to health arising from its use for drinking and domestic purposes.

What has been said with regard to the protection of springs obviously applies to wells. In fact, a well may, for the purpose of this discussion, be considered an artificial spring where, in the place of a natural flow, there is substituted an artificial flow induced by pumping. The flow through the soil and other hydraulic features are closely analogous. One important difference, however, is that a well being largely an artificial source of supply, can usually be located in positions which, as compared with natural springs, are more subject to polluting influences. In fact, we not infrequently find public well supplies located for sake of convenience, but with false economy, nearby, or in some cases in the midst of, a populous section of a municipality. The protection of a well so situated is usually a hopeless proposition, for as I have pointed out, corrective measures are generally inapplicable. The corollary is therefore strikingly simple; that if a community decides to adopt a well source of supply, it is imperative that it be located at a point where it will not be subject to underground sources of pollution. If this precaution is initially observed, the preservation of the supply will be a comparatively simple matter

by means of the protective measures alread
nection with spring supplies.

In a paper, so necessarily brief as this mus
the scope of which might be extended almost
ficult to keep within bounds. Details have b
purpose of emphasizing certain important
safeguarding of water supplies. I shall fe
contributed any ideas or points on this su
of taking away with you, and if I were p
of suggesting to you the points which I sh
carry away, they would include the followi

(1) That the preservation of the purity
plies is practically paramount to nearly all
health and welfare of any community.

(2) That communities which use a su
rived from inhabited watersheds do so at th
water is first purified or unless complete s
enforced.

(3) That where protective measures ar
water supply pure and safe, corrective m
and sewage purification, can be relied on t
the water to the necessary standard.

(4) That the question of what protecti
ures are necessary in any particular case,
ance of health and economic consideratio
usually requires expert knowledge and j
should never be left to the decision of non
to local officials, if they are inexperienced

(5) That ground water supplies do not
to corrective measures and if once they b
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reason, it is highly important that they b
to remain free from subsurface pollution.

These suggestions are largely generalit
they are important; and if fully appreci
municipal authorities generally, the stan
of water supplies of the state would be c

Discussion

Mr. Lee J. Vance.— In opening this discussion I think some reference should be made to the recent changes, both legal and economic, that have been brought about by our three kinds of food supervision, namely, national, state, and local.

Theoretically, the national government should not interfere with rights and powers of the states to supervise their own food supplies. But under the Meat Inspection Law, for example, federal authority has stepped in, and it now regulates and controls local food industries which the states alone are supposed to regulate and control.

State supervision is no longer limited in effect to the borders of a state. It now makes its power and influence felt upon thousands of producers or manufacturers of food supplies in other states.

So, too, local supervision of food supplies is regarded as purely local, but it may extend far beyond the borders of the municipality which makes a sanitary regulation or law. For example, on January 1, 1912, the board of health of the city of New York adopted stringent rules and regulations, which not only prescribe the exact conditions under which the sale of milk will be allowed in that city, but they really control the conduct of farms, dairies and creameries hundred of miles outside of New York. Thus, while the supervision is local, yet it reaches out and includes the inspection of more than 40,000 farms in seven different states. This is a striking instance of how far local supervision of food supplies has been carried.

Briefly stated, food supervision, to be effective, must go to the source of production. This means proper inspection of all raw materials which enter into food products. These materials should always be sound, mature and clean.

Next comes the proper regulation of all establishments manufacturing and distributing food supplies. This requires that our food should be produced under sanitary conditions. All employes handling food materials should be neat and clean and free from disease. They should be subject to medical examination before entering employment, and afterwards they should be examined from time to time while they are engaged in handling foodstuffs.

For convenience, food supplies may be divided into two broad classes: The solids and the liquids. Most attention has naturally been given to the great staple food products, such as bread, meat, eggs, butter, fruit, and so forth.

The second class of food supplies is hardly less important, for it includes the many articles called "beverages." This term covers a long list of things, from the different liquors and soft drinks to milk and potable waters.

On the whole, few food products are produced with greater care or under better conditions than the alcoholic beverages. The reason for this is obvious. It is to the interest of the producer or manufacturer of such beverages to have clean raw materials and to maintain good sanitary conditions. Otherwise, the quality of his product will be inferior; it may easily become spoiled, and then it means a loss. Those who are familiar with the processes of manufacture of wine or beer, know how necessary it is to use sound, clean materials and to guard the product from contamination at all stages in order to get a first-class result.

The production of soft drinks has increased enormously of late years. The supervision of this class of beverages leaves much to be desired.

Many of the soft-drink establishments are utterly insanitary. Some of them in the cities are situated in dirty basements and cellars and in cheap sheds. The employes in such places are often unclean in their habits and careless in the handling of the beverages.

Many of the well-known soft drinks are more or less adulterated. Usually, the so-called "fruit syrups" in the soda water drinks are deceptions, in that they are only synthetic compositions to imitate the natural fruit juices, such as strawberry, raspberry, pineapple, etc. Some of the adulterations are harmless, and some are not. Some of these soft drinks hide under trade names, and others, which contain drugs or peculiar ingredients, are alleged by their makers to be protected because they are sold under what the pure food law terms "distinctive names."

There should be proper supervision of the drinks at soda water fountains, where scores and even hundreds of people daily use a common drinking glass. Too often these glasses are merely rinsed in dirty and contaminated water contained in a tub or trough behind the counter. Either abolish the common drinking cup or sterilize the glasses used in public places.

The sanitary control of public and private water supplies is a subject by itself. There is usually careful inspection of waters from the public supply. It is not always so with waters from private wells and springs, which are bottled and sold in large quantities. Every municipality should adopt and enforce suitable rules and regulations to insure that water consumed by its citizens is safe and clean.

In conclusion, I would paraphrase a celebrated political axiom and say: Eternal vigilance is the price of pure food.

F. M. MEADER, M. D. (Syracuse) — For the last two years we have examined the water at the nearby pleasure resorts and the water in wells and springs by the roadside in the vicinity of Syracuse. The reports are made to the owners and, for the most part, very gratifying results have been obtained. We have been particularly pleased with the managers of the local suburban railway lines for the prompt and efficient way in which they have improved and cared for the water supplies at the pavilions under their direction.

In general, we may say that new water supplies have been obtained, poorer ones have been discarded, protection of the well curbs has been improved, suitable covers for cisterns have been provided, and new hydraulic machinery has been installed in order to improve the water supplies.

During the past summer the commissioner of public safety has directed that wells and springs along the roadside in the vicinity of Syracuse that contain safe water should be labeled. For that purpose a tin disk about six inches in diameter has been provided on which was stated, "Bureau of Health. City of Syracuse. This water has been examined and found safe for use. Date." It is our plan to continue this work until all of the wells and springs are put into excellent condition.

THE HEALTH NURSE AN

BY JOHN S. WILSON,
Poughkeepsie

The ever-widening field of health wor lems from time to time. No longer do we by curing it, but we reach out to the fc and inaugurate a sanitary and hygieni mine the physical character of the out consider only the insanitary problems (satisfactorily solved by a police officer, vent these problems by regulating antec we meet disease, not as physicians who the ills of mankind, but we meet it a the road to safety, which is in the dir and death.

The board of health is becoming n social factor in the community. Model of disease call for a type of health required to supervise the removal of quarantined premises.

In all but the larger cities, the boar man for the tremendous modern move betterment. As a direct result of this c point, new duties have been thrust upon of these duties have been imposed by sulted from a demand of the people t the health propaganda, and still othe cause of the health officer's initiative present-day needs. To meet this inc time and energy, officers have been crea from time to time, as the need for a n demonstrated. Thus, health work has its efforts and many professions and c Thus, we find teachers, physicians, eng

bacteriologists, chemists, preachers, nurses, social workers, and others engaged in this work of social uplift.

The health nurse appears to me to be a social worker on wheels. She is here, there, and yonder, before the physician or health officer realizes that she has started on her mission. She is the one person to find tangled ends in the social fabric and to bring one strand to another and thus work out a design. She is the connecting link between the various working forces in the struggle for social betterment. She may be sent out by the board of health to visit a person, but before she has completed the task she has interviewed a pastor, the board of charity, the school nurse, has visited the jail, consulted a doctor, etc. She is, indeed, a busy body. There are but few men who possess the skill and tact to do just what the health nurse is doing.

In the field of tuberculosis work, the nurse is kept busy. It is needless for me to attempt to picture to you the spectacle of a discouraged home where there is advanced tuberculosis and abject poverty. In these neglected rooms she does things, and she directs others to do things. Under her direction in a short time the place has undergone a transformation. The patient has had a bath and some clean bedding has been found. She has made an appointment to call next week to take the children to the tuberculosis dispensary for examination, and she will ask the doctor to call to see the wife who is unable to leave her sick husband.

She has promised to secure some coal and shoes for the children, and milk and eggs for the patient, etc.

The health nurse is in attendance at the tuberculosis dispensary. She becomes acquainted with the newly discovered cases. and later calls at the homes and learns under what condition they are living and sleeping, and endeavors to bring other members of the family to the dispensary for examination.

She revisits the careless and indifferent cases and urges them to attend the clinic. She follows up the cases of tuberculosis reported to the health officer,, and assists the attending physician in the care and nursing of the patient.

The health nurse could assist in securing a complete registration of births. She could take the name of every baby she meets

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DISCUSSION

FRANCIS E. FRONCZAK, M. D. (Health Commissioner, Buffalo)

Dr. Wilson is a very modest man indeed. Asking him for a copy of his paper, which has just been read before this Conference, he sent me a note wherein he states, "There is nothing in it to discuss. My paper is unsatisfactory to myself and contains nothing original." It is true that there is little left for me to discuss, but I shall, however, in order to comply with the request of the Commissioner, add a few remarks.

In a city there are of necessity nurses for the various kinds of work connected with the department of health — there are the school nurses; nurses who care for the advanced and neglected cases of tuberculosis; nurses who care for the infants, teaching the mothers how to look after their offspring even before birth, and later, how to properly clothe and feed them and protect them from diarrheal disorders; these nurses are usually connected with the milk stations; nurses to care for those suffering from contagious diseases in their homes, and, finally, nurses who look after and care for the destitute and poor sick suffering from diseases where hospital care is impossible for various reasons.

It would be rather difficult in a short discussion of a few minutes to cover properly the work of the various types of nurses connected with the departments of health of various municipalities. The subject was ably handled by Dr. Wilson, and even here, I must repeat much of what the doctor has so thoroughly covered. I shall speak here only of two types of nurses, one looking after the tuberculosis cases, the other who looks after the school children, as these two typify best the work done by that important supplement to the sanitary paraphernalia of a modern city.

Of course, the tuberculosis nurses work along educational lines more than in actual nursing. It is incumbent upon her to investigate the surroundings of the consumptive, the possibility of taking the cure in the open air, expectorating arrangements, and to determine the possibilities of segregation so that the patient may not be a danger to his or her family and the community. The tuberculosis nurse should also prevail upon those who have been exposed in any way to the disease to undergo a proper examination, to see before it is too late that they themselves are not victims of this dreaded malady. Of course, these functions must be accomplished only with the consent of the attending physician. By segregation, I mean that a patient should be sent to a properly organized hospital or sanitarium. If that is im-

possible, there being no hospital in that locality, or, as sometimes happens, there is not sufficient room provided for all the patients who are anxious and desirous of entering such hospital, or there is strenuous objection on the part of the patient and the family to separate, it is then the nurse's duty to see what precautionary measures can be taken at the home for isolating the case. The patient who is too ill to properly care for himself, must be made as comfortable as possible and the nurse should become an apostle of cleanliness and instruct the family how it may protect itself from infection; how to properly prepare the food for the patient; how to disinfect the cooking utensils, bedding and surroundings of the patient. From experience, we find that if, as the State law provides, the physician states he is able and willing to properly care for the patient and instruct him in the many precautionary measures which ought to be taken, the nurse cannot take care of the patient unless she is requested to do so by him. We also find through experience that the department of health can accomplish better results with its own department nurses and tuberculosis medical inspectors than when the attending physician looks after the patient himself. Of course, I refer to the poor patient only. It is not believed that one examination of those who are exposed is sufficient and the nurses should insist upon further examinations from time to time. If the financial condition of the patient is such that neither he himself nor the members of his family are able to take care of themselves, then it is incumbent upon the nurse to notify either some aid society or the city poor department, that they may be given such aid as may be indicated. It is among her duties to look after the sanitary conditions of the house, and if the conditions are far from satisfactory, the nurse must take upon herself the task of seeking more comfortable and sanitary rooms. Her chief function, of course, is her insistence upon cleanliness, fresh air and ventilation, which are absolutely necessary for the patient and family in order to either effect a cure or lessen the danger of infection of the other members of the family.

The other type of nurse, of which I wish to speak, is the school nurse. In a paper which I read last week before the physical training section of the State Teachers' Association which met in Buffalo in its annual conference, I spoke of the co-operation of the principal, the teacher and the medical school inspector. Anyone who listened to the paper would probably receive the impression that I considered the school nurse as being a very small cog in the wheel of preventive medicine. I, however, know that a school nurse can be of the greatest help to the principal and teacher

and can save many a child from subsequent criminal life, not to mention prostitution, by detecting various defects of this child.

It is a well-known fact that the influence which a school nurse has upon the parents and children is of such importance that in many countries medical school inspection is now made mandatory by law, and a school nurse should be attached to every school. She is the one who comes into the homes of the poor to investigate all cases of illness and to instruct the mother in various directions; she is the one who looks after the children suffering from various maladies; she is the apostle of cleanliness and of fresh air and personal hygiene, especially cleanliness of the head, the hands, the feet and the clothing. It is she who insists that "Cleanliness next to Godliness" is the greatest virtue; she instructs the mother in the necessity of fresh air, the preparation of proper and wholesome food, and discusses the dangers to the child of improper feeding, under- or over-feeding. It is usually she that tells the mother how to rid the heads of the children of lice. Of course, the mother oftentimes resents such intrusion on the part of the nurse, but you can appreciate that a child carrying a minute zoological garden in her head cannot make much progress in school because it is too busy doing something else instead of paying attention to the teacher.

Persistence is a very important virtue on the part of the nurse; it is up to her to remove parental objection by tact and diplomacy, and her visit becomes welcome instead of bringing fear to the mother. It is the nurse's duty to follow up the work of the medical school inspector and, if she is well educated, properly trained, sympathetic, the seeds of sanitation planted by her will bring forth the most beneficent results. Of course, it is always expected that the school nurse will work under the supervision of the medical school inspector, for she can be of great help to him in various directions and can call his attention to the various deficiencies of the child, maybe the condition of the eyes, the nose, ear deafness, mouth breathing; she may, by reporting to the medical school inspector the home surroundings, be able to help him to determine the cause of the child's physical ailment. She must go to the dental clinic to have the teeth attended to; to the otologist and ophthalmologist to care for the ears and eyes.

Anyone who has seen the suffering of children a few years ago in the poorer quarters of the cities and the children of to-day, after the beneficial visits of the school nurse, must consider almost miraculous the progress that has been made in the preservation of health in the school child.

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preventive medicine.

A SANITARY SURVEY

By Mr. M. N. Baker

Editor, *Engineering News*, New York City, and President of the Board of Health of Montclair, N. J.

The one object of a health officer is to conserve the public health. To achieve this noble end in even a modest degree a health officer must first have a clear understanding of what counts in public-health work, then ascertain just how much efficient health-protective work is being done and how much left undone in this city under his care, then formulate a plan for future work, see that it is put into effect, and make careful and frequent note of the results.

To all who understand what this involves it will sound like a large program, and such it truly is. But the health officer must not think that he has to do all this single-handed, for that would be an impossible task. He must secure the co-operation of his brother officials in the city government and of various private interests as well, and he must, above all, have public opinion at his back.

The health officer needs the co-operation of his fellow officials because the health of the city depends largely upon the provision and the efficient operation of various public works and services which properly fall in other city departments, and also because he is dependent upon the council and mayor for funds. He requires the co-operation of various private interests, organized and unorganized, engaged in serving the public with various necessities which affect the public health, because without that co-operation much of his work will go for naught. He needs public opinion at his back because without that backing no city department can succeed, much less the health department, which is in large measure dependent for its success upon the intelligent and sympathetic support of the citizens.

I shall be better understood in all I say, and particularly as regards the co-operation of other city departments, if I state my belief that except for certain classes of inspection and a considerable amount of research and educational work, a health department,

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other health-protective work of the city, in o
that, in the inevitable distribution among cit
work more or less closely affecting the public h
sential shall be neglected, while at the same time
and divergent lines of work shall be thoroughly c

proportioned, and provided with as ample funds as the current state of the public treasury will permit. Without such correlating and proportioning some lines of city work fatten while others starve.

Before giving more specific consideration to what should be included in a sanitary survey and how such a survey should be conducted, I wish to lay still further emphasis upon its value as a guide to the health department, as a means of securing co-operation from other city departments and of gaining the support of public opinion. I shall center my further remarks under this particular need on the sanitary survey as a means of getting appropriations for health and sanitary purposes.

We all know that there are many more and much larger demands upon all our municipal treasuries to-day than they can possibly meet without exceeding legal tax and bond limits or, where these are no bar, without arousing the indignation of taxpayers and hurting the credit of the city. It is therefore imperative that every city department be able to back its budget estimates, or requests for annual appropriations, with incontrovertible facts as to the need for the money requested. Such facts, as related to health appropriations, depend in large measure upon well planned and carefully executed sanitary surveys, and when secured they make city councils and taxpayers alike willing to provide the money necessary to execute a program based upon these surveys and facts, while at the same time disarming opposition of other departments to the desired appropriation and insuring the co-operation of the other departments in carrying out the program.

Moreover, sanitary surveys, in conjunction with an intelligent interpretation of vital statistics (and I am taking it for granted that accurate and complete vital statistics are available), will enable the health officer to use every dollar of his at best too scanty appropriation in the way that will count most in prolonging lives and conserving health; and they will aid the officials of other city departments in co-operating to the same end.

If the statement last made be true, as I most strongly believe, the selection of subjects to be included in a sanitary survey may in large part be chosen from a functional classification of health-board expenditures broad enough to include nearly every line of

health-board activity pra
classification, made by tl
August, 1911, is appende
expenditures into three g
II., Indirect, Health-Prot
tures (those not readily d
these main groups is furth
my disposal makes it imposs
in detail, but I wish to call p
municipal cleansing items, al
direct Health-Protective Wor
country a few of these, like mo
would probably be better plac
tective Work.

Whatever may be the opinion
of my classification of health boa
under discussion at present), I th
full to serve most health officers as
a sanitary and health-protective surv

Using the term "sanitary survey"
ing throughout this paper, I would s
partment might advantageously survey
city under most if not all the items inc
Protective Work, which has as its main
tion and Control of Communicable Dis
of Infant Mortality and (3) General He
tenance. Besides the obvious sub-items i
may be mentioned medical school inspectio
tory inspection, mill control, pure water a
do not exhaust the list.

Broadly speaking, a survey should not t
Health-Protective Work, until I., or direct
covered, the results worked up and steps take
the reforms and extensions of health-protecti
gested. When Division II. is entered, unless it
the whole field at once, topics may be selected
ing to the special needs of each locality. As a r
system and all that pertains to the storage, collect

of night soil would perhaps demand first attention, particularly in the smaller cities, where many streets are unsewered and many houses are not supplied with public water, and therefore the people are liable to drink polluted well water and one exposed to dangers from open privies. Street cleaning probably deserves particular attention in many cities. Fly, mosquito and rat reduction may need to be given early attention in some cities and may have little relation to public health in others. Garbage collection and disposal probably have less direct bearing upon the public health than most health officers suppose, and whether so or not, a survey of this line of work would be comparatively simple.

How a sanitary survey should be conducted in detail is beyond the time limits of this paper, even had I yet attempted to work out a system. The score cards in use for dairy inspection serve admirably both as a guide to inspectors and as a standard for recording results for comparative purposes (see reproductions of a number of these in Roseneau's " The Milk Question," Houghton Mifflin & Co., 1912). A similar plan has been worked out for ice cream manufactories by the New Jersey State Board of Health. The New York tenement house department has a complete record card for its inspections, and probably there are but few of our larger city health departments that have not worked out a number of record forms which would serve as models for score cards for various elements of a complete sanitary survey.

By whom should a sanitary survey be made? Preferably by the health department, with the co-operation of the other city departments directly concerned. In most cases it would be advantageous to secure the advice and perhaps the directing services of a competent consulting sanitarian from outside the city, so as to get the benefit of broader experience and outlook than would otherwise be possible and to have eyes not dulled by familiarity, perhaps superficial, with local conditions or blinded by local prejudices.

I trust that no one will confuse the kind of sanitary survey which I have in mind with the hasty general inspections of a few of our cities which have been made by some " expert " possessed of more zeal for uplift work than knowledge of how to accomplish it and with little understanding of or sympathy with what is already

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correlated with the vital statistic
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terms of unit cost. This presupp
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tary expenditures in accordance
and, last but not least, an intellig
vital statistics and unit costs in ter
the city official and the citizen alike.

FUNCTIONAL CLASSIFICATION OF HEAL
SUGGESTED BY M. N. BAKER,

I. Direct health-protective work.
  (1) Prevention and control of co
    (a) Laboratory.
    (b) Notification and investiga
    (c) Immunization.
    (d) Isolation in home.
    (e) Hospitalisation.
    (f) Disinfection.
    (g) Medical school inspection — diseases.
    (h) Records.
    (i) Educational.

(2) Reduction in infant mortality.
- (a) Medical.
- (b) Nursing.
- (c) Supplying milk, etc.
- (d) Records.
- (e) Educational.

(3) General health-building and maintenance.
- (a) Laboratory.
- (b) Physical and mental inspection of school children.
- (c) Housing control.
- (d) Factory inspection.
- (e) Milk control.
- (f) Pure food and drugs.
- (g) Pure water.
- (h) Pure air:
  - Ventilation.
  - Gas inspection.

II. Indirect or remote health-protective work.

(1) Municipal cleansing.
- (a) Garbage.
- (b) Ashes.
- (c) Rubbish.
- (d) Dead animals.
- (e) Offal and market refuse.
- (f) Night soil.
- (g) Sewage.
- (h) Street cleaning and sprinkling.
- (i) Smoke prevention.
- (j) Fly reduction.
- (k) Mosquito reduction.
- (l) Rat reduction.
- (m) Records.
- (n) Educational.
- (o) Publicity.

(2) Private cleansing.
- (a) Plumbing permits and inspection.
- (b) Suppression of smells and miscellaneous nuisances.

officer with his supposed training and discriminating insight, gave personal attention to all matters pertaining to the work of the board. In later days, when an organization was added, duties differentiated, work divided, and the different subdivisions of it were entrusted to intelligent, though possibly less trained assistants, it could hardly be expected that the same qualified and discriminating service was given in individual cases and with the same efficiency as in the former days when one man performed all of the daily duties of the board. I do not mean to say that many local departments of health can be administered by a single health officer, particularly in cities, but I do mean to emphasize the point that the net efficiency in health work, within, of course, certain limitations, is proportional more to the qualifications and efficiency of the men than to the number of them.

This leads me at once to a consideration of the suggestion in Mr. Baker's paper of delegating certain duties, such as the correction of public or private nuisances, inspection and correction of plumbing in buildings, etc., to other municipal officials who, though having assumed proper qualifications, are not under the direct employment of the local health board. With such a proposition I can see opportunity for considerable difference of opinion. The specific matters, nuisance and plumbing, referred to merely as examples, are in my opinion ones which, though they undoubtedly have no serious effect upon public health, do nevertheless have an indirect association with it, and through long-established custom do constitute an essential part of local health work; and their exclusion from the supervision of the health department in even a partial degree might, I feel, lead somewhat to indifference and inefficiency. Every health officer knows how difficult it is at times to deal with local nuisances. Furthermore, cleanliness is so essentially necessary to success in public health work that I fear any neglect or omission in the matters referred to might, as suggested, have a demoralizing influence, as it were, when it came to enforcement of other health measures which may be more important, but concerning which the ordinary citizen is incapable of discriminating.

Let us assume, for instance, that the ordinary policeman, as a part of his regular police duties, is to act as a sanitary inspector and to enforce ordinances with respect to nuisances such as those due to garbage or overflowing cesspools and insanitary privies. In the first place, few policemen are qualified to judge of these

informally and that they have been prompted without forethought.

As I listened intently to this paper, three points seemed to impress me. The first of these is the apparent change, if not contrast, in the present day views concerning the legitimate duties and functions of a local health board and its health officer as compared with these duties and functions some two decades ago. The second is with reference to the question of efficiency of work resulting from the delegating of some of these duties to other municipal departments or officials than the local health officer. The third is with reference to the sanitary survey from the viewpoint and activities of a state board or department of health as compared with that of a local board of health.

When I look back upon my experience as first health officer of Montclair,— upon the ambitions of members of that board and especially its able president in establishing and developing a model board of health, and upon the rather single-handed struggle which the health officer, as sole executive agent, had to encounter in executing the plans of the board; and then compare with it the more elaborate organization and differentiation of work of a modern local health board under the more elaborate classification suggested in Mr. Baker's paper, I am much impressed with the marked and wonderful progress that we have accomplished in local health work during this comparatively short period. In former days the health officer was a sort of composite of executive head, inspector of nuisances, inspector of plumbing, chemist, biologist and general bureau of information, whose powers and duties it seemed led him through the course of his daily routine to investigate many things public and private within the town and a few of them outside of the town that were within bicycle range — at that time a convenient and economical means of transit. These experiences stand out in marked contrast with the modern and more complete organization, differentiation of executive duties and convenient facilities afforded some of our modern boards of health.

Now I have referred to these experiences not so much for the pleasure of reminiscence as to emphasize the views which I wish to state with reference to the efficiency of local health work when it comes to delegating to other than trained men under the immediate employment of a board of health certain duties which may be not only directly but also indirectly connected with public health. In the older days, so to speak, the single-handed health

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In the first place, few policemen are qualified to

matters. Secondly, they would find the work personally objectionable and be inclined to neglect it. Thirdly, while they would be qualified to deal with infractions of peace laws with the lesser exercise of discriminating power that these entail, they might be wholly unqualified to use the tact and discretion which is so characteristically necessary in dealings with local sanitary nuisances.

In the case of plumbing I feel somewhat differently. There is here, as in the case of say the garbage nuisance, no direct effect upon health. Plumbing may be considered a more or less exact art or occupation, the principles and regulations governing which are relatively simple and clear-cut. Little supervision outside of inspection and testing are required in dealing with it. The piping system is connected directly with the sewerage system which should obviously not be under the control of the local board of health. It is about on the same footing as the question of supervision of ventilation. It would seem to me, therefore, that plumbing might very appropriately be included under the duties of tenement house or building inspection and supervision. This raises, however, perhaps a more important question as to whether tenement house work, including ventilation, plumbing, light, etc., all of which are matters indirectly affecting public health, are within the practical limitations of a board of health, should not be brought under the control and supervision of the local board of health. I feel that it should, for these matters of plumbing, ventilation, heating, etc., are being made the subjects of special instructions and training in the different colleges and institutions having courses in sanitary engineering and public health and of course can be better supervised by men so trained.

In brief, then, I am inclined to feel that it may make for higher efficiency, concentrate responsibility and afford better co-ordination and control, if most or all of the municipal work associated both directly and indirectly with public health is kept under the immediate control of the local board of health. Exception might be made, however, in the case of plumbing and some other matters, the supervision of which might, without sacrifice of public health, be left to tenement house or building inspection departments. To continue the supervision of all matters pertaining to public health by local boards of health will, I fear, for many municipalities require more funds than are now usually provided, a feature which has been and probably will continue to be an obstacle to greater progress in public health work. I

believe, however, that as a resu
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A few words now with refere
from the viewpoint of the Stat
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surveys along two distinct lines.
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The first of these surveys con
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streams in the watershed areas ref
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water supplies of municipalities w
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survey maps obviously constitute a
pensable, means for studying sewage
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The other sanitary survey, and o
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sewage disposal, garbage disposal a
classified under public health measure
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erally upon the sanitary conditions a
question, and to make recommendation.

These sanitary surveys of the condi
the state have proved of considerable
out in our recent annual report, out o
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have carried out to their full extent; or our legislative bodies have not realized the great advantages to be derived from carrying out these measures which science has taught us are effective.

We find the prevention of communicable disease is not so much a scientific problem as it is an administration problem, or a sociological, or an industrial, or an economic problem. We find hygienic progress is interwoven with every other type of progress; and we shall advance in hygiene somewhat proportionately to the rate at which we advance in economics, in sociology and in the general principles of the development of the human race.

We cannot expect to carry our part of this scheme of progress ahead of the rate of general progress in the development of the human race; but in America, with its wonderful industrial development, we find in studying the statistics that we have lagged behind in hygienic progress; that we are disproportionately behind in carrying out well-known sanitary methods in saving lives now sacrificed every year. So we are confronted with the problem of bringing our hygienic progress up to the average of other progress being made in this great country.

Take one of our diseases well known to all our sanitarians, typhoid fever, whose mode of spread and the nature of the infection are well known to all of us, and yet we permit this disease to spread in every American community every year, and the American nation suffers a typhoid rate several times as high as the rate of most of the other civilized countries of the world. This is a comparatively readily preventable disease, but its records stare us in the face, and it is a disgrace to our nation that we permit it to destroy our people as we do.

It is not because we have not the knowledge. What they have done in Germany to eradicate it we know about; and what has been done in France and in Switzerland we know about. We know that typhoid is spread from person to person, the excreta conveys the infection, and it is transported in the water supply, the milk supply, and various food supplies, or by flies or fingers or anything that will serve to convey the infection from the excreta of an individual infected to the mouth of a susceptible person. Epidemiology has pointed this out and the prevention of typhoid fever is not a scientific problem any longer; but the

Second Day, December 5, 1912 ·
Towns anc

The Conference was called to o

THE CHAIRMAN — In introducing Dr.
a prolonged statement. We all know
Service and the work it does, and the l
country. We all know Dr. Lumsden, w
meetings, even some before I was conne

THE CONTROL OF COM PREVEN

By L. L. Lums
Surgeon, U. S. Public

It is a very great pleasure to agai
of the State of New York. I recall
ing I had with you at Rochester, an
of the best health conferences I ever

I think it is very fortunate for a
tives of the various health departm
of the national health service may co
big problems which confront all of us
teresting time in the period of our dev

I find a rather heroic title on the pr
Communicable Disease," assigned to
possible to do more than touch certain '
that kind in a brief talk. I am going
since it is your particular business rath
ness, I am going to try to discuss specia
the local health officers have in the
progress.

We know at this time that many of th
Many of those diseases which cause a hig
can communities are thoroughly preve
health officers we know there are certain
stacles, in many instances, to the enforce
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problem now is to get the efforts
this disease at work in an inte
any city which has a clean water
and a clean food supply generall
sewerage system, or other systen
will not have a high typhoid rat
typhoid rate in such a community

Those measures will not only
will prevent a number of other d
fection which may be water-borne.
diarrheal diseases, are conveyed by
that not only has typhoid been re
general death rate is reduced by th
erage system. We find upon straig
a city that infant mortality, and dy
and scarlet fever and other epidem
control of the milk supply we have a
tation.

As sanitary officers we should ke
consider the measure which will do t
the community. I do not think th
better than a sanitary sewerage syster
infection which lurks in the waste ma
body.

On cleaning up the water supply in
of the country, we find that the typhoi
one hundred or two hundred to twent
cleaning up the water supply, we find
a high typhoid rate, a death rate of 5
sand. In other words, we have a long
which we do not have to the same de
summer season is favorable to the sprea
agents other than water. That is the wl
northern typhoid rate and the southern

I am supposed to cover this whole s
on to tuberculosis. Science has taught
through the sputum of infected indivi
through the community and detect the i

oughly isolate them, that would be one possible way of controlling tuberculosis. But that would be out of the question; the people would not submit to such an heroic measure as that. If we could readily enforce laws against expectoration we should be able to prevent the greater part of tuberculosis. (Of course, the fingers might convey the sputum from one person to another.) But we cannot carry that out in a large community. We can do so in a sanatorium for tuberculosis cases, but for a large community that is hardly a practical way of approaching this big problem. So the practical sanatorium goes into the psychology of the condition — improving the ventilation of the factories where the people work, and trying to educate the people to ventilate their homes better at night, particularly their sleeping rooms, and in that way get greater resistant power to disease.

The spread of the "Great Black Plague," venereal disease, is known by the general adult population in civilized communities, but feasible measures for its control, to say nothing of its eradication, are yet to be searched for in the mists and mazes of sociology.

Science has shown that the eradication of the bubonic plague from a community rests largely upon the destruction of the rats — that the eradication of malaria and yellow fever depends upon a successful fight against certain mosquitoes. The measures for the destruction of rats or of mosquitoes are simple but expensive; and their application by governmental authorities depends upon the force with which they are presented as wise administrative policies. The successful health officer has to determine how far the people are ready to go; how far he can make them go with a campaign of education; and if they will submit to these measures when they find they are subjected to some personal inconvenience and embarrassment in some instances by having them carried out.

The prevention of malarial fever, which means a fight against mosquitoes, has been carried out well in some places, especially in Panama, in the Canal Zone, by becoming the big issue, or the main issue, in the building of that Canal; and they took charge of that work so that it would be a safe place for a man to work and live; and their success there is one of the most brilliant pages of successful sanitation.

The work in San Francisco has
Plague, the Great Black Death, is

But it takes the sinews of wa
prevent these things. In other w
supply the material and it has go
for this work, or it cannot get on.

So, in the broad general sense
subject, the prevention of preventa
or psychological problem than it is
health officer must consider these o

Why, in this country, do we not
do? The people rule here, at least
are devoting columns to public
are spreading the gospel of health
the people generally. The popular
Health officers are showering the c
stating in plain terms the facts on
last night a series of moving pictur
tell the story with such simplicity
gent person could see without being
aroused and he has an intelligent m
whether it was exaggerated and if
something which it will be good fo
there were thrown on the screen cert
culæ, not disease-producing organis
will also find out that mixed with t
there are small ameba coli and other
which give typhoid fever, Asiatic cho
will learn that the picture which w
true; and that if you boil the wate
perfectly safe water for drinking pu
education is going on.

Who are the people who must be
no city or state or county or village
vinced that the people want to inves
that they will be willing to do so. E

* Reference is here made to the well-kno
Editor.

for themselves. The citizens' organization must let the government know we want these things. The health officer is the educator of the community along public health lines. He should be trying to bring the forces together to drive this work along. He must get his people educated so they will want to do these things, by showing them it is a a good investment.

We find people taking out insurance against accident and fire destruction of their property. Why do they do that? It is not because they expect their house will burn down in a few days, though, of course, in the case of life insurance, they know they will die some time, and they take out insurance policies for the protection of other people in the event they are injured. The prevention of disease is on exactly the same principle, but we have not as energetic agents spreading this doctrine among the people as the fire insurance companies and the life insurance companies employ. The health officer must be the public health insurance agent of his community. He must show the people that this is the best insurance policy they can take out, and he must show them how by putting in so much per capita, they will get a good water supply, and proper sanitary means for the disposal of sewage, and that will cut down the diarrhea and infant mortality and dysentery ninety per cent. The citizen hearing of this prevention of preventable disease listens in a hazy sort of way as he might listen to a discourse on the question of the doctrine of salvation — as a good thing to consider but not an immediate issue. He has issues which he must attend to immediately; his crops, or his downtown business and his daily routine force him up to the notch all the time.

The last men to be reached, the last ones to be convinced, are the members of the legislative bodies; and that is the place where we must go for our appropriations to carry on the work. I am a firm believer that every community in the United States is entitled to an efficient health administration, and to get that we must have some one on the job whose business it is to keep health matters straight. You must have an efficient health officer and you must have a sufficient force to carry out the measures that are needed and which the people are ready to have carried out. If the people let the lgislative bodies know they are willing to

pay for it they will get the
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them, the people want it done
people he is a worthy man, he
good chance of getting, his sal

I have seen these general p
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In Yakima County, State of
was inaugurated in June, 1911.
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about 200 per 100,000 of popul
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death rate was reduced by over
rate from all causes about fort
the county seat, with a populat
there has not been among the re
over twelve months, and there h
only five typhoid cases of local or

What Yakima County has done
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and with Yakima's example befo
the feasibility of preventing pre
districts.

The National Congress in its la
a national public health service,
possibilities. It is given authorit
conditions pertaining thereto. D
that? Does the national governm
investigation than that? What th
most urgently is men and money t
it with our hands folded in Washin
Congress and let it know that the
ernment to go into health matters i
gress will go to work and make the

The same will apply to the st
matters. We find most efficient he

states. New York is a notable example of that, which is recognized all over the country. But in many other states they have not put up the funds and shown their legislative bodies that they mean business.

The same applies to our large cities; some have very efficient health administrations and others very poor — very, very poor. But the county, gentlemen, which to my mind is the logical administrative unit, has been neglected; and the big success in Yakima county was due to the fact that they made the county health officer the unit: A county health officer, with a deputy in each district — and as a rule the deputy was the health officer of the town in that district, so that he got a salary paid to him as an officer of the municipality as well as one paid by the county, and the two salaries permitted him to devote some of his time to health work. That plan can can be carried out pretty generally throughout the country.

THE CHAIRMAN — We must stop here to express regrets to Dr. Lumsden for the death of his Chief, Surgeon-General Wyman, and I ask all the gentlemen present to join with me in that expression of regret at the loss of Surgeon-General Wyman, by rising.

THE CONTROL OF COMM HOME ANI

BY A. D.
Go

Prefacing any suggestions as important avenues of reaching sider the present situation now e and in many of the school buildi of the state.

We know, first, that we are preventable diseases. We also k extent, refuse to properly ventila houses. The common drinking c is especially a means of disease t sidewalks, and in public places is communities, and in many of ou water is contaminated, being a fre of typhoid fever to our cities. N destroy the well-known disease-distr sucking stablefly, the stomoxys ca gations made by the U. S. Public reason to believe to be the infectin paralysis. In the system of quar districts we fail to attain the results the farmer in the care of his dairy, he is very likely to carry infection housefly. Rural boards of health, meet very infrequently and are ofte the health laws. Health officers, a their services, and, as a matter of f are so far influenced by the sentim prising their jurisdiction as to sadl upon them by law. Attending physi are often at fault in the tardy reportin the frequent result of the appearance which would not have occurred with th

the means of control of one communicable disease, by simply isolating these people until it is clearly shown that no bacilli are present.

To my knowledge it is the common custom in some localities to rely entirely upon a clinical diagnosis in diphtheria, and to raise the quarantine when the patient seems to have recovered, no cultures being taken at any time. May we not ascribe the continued existence of epidemics largely to this cause?

As to the homes and the very
members of the household should
other course would be as effective
inspection made by the health offi
only include an examination of the
a careful survey of the premises;
supply and possible sources of cc
location of all outbuildings. It wc
tion by giving a well-considered a
on the subject of communicable dis
in every home a placard, so that al
might follow.

The measures suggested herein
siderable outlay of money, but if c
a conservation of human life and
considerations sink into insignifica
saving of time which otherwise wou
establishment of quarantine. Taki
should not be difficult to convince th
of the merciful and economical valu

I desire to conclude this paper
theria. For more than two years
rural school district of one of the
with a mortality of 25 per cent. U
energetic efforts of the present healt
tinued. If he is present to-day I ho
to the present condition.

Seven weeks since the same disea
entirely on the other side of the cou

All of the cases were placed und
tures were made after three weeks.
each showed bacilli present in all ca
of the throat of the afflicted members
dition continues to the present time.

Three weeks after the beginning
patients presented any clinical signs
ently, fully recovered, but the bacte
that they are still infectious. Here

the means of control of one communicable disease, by simply isolating these people until it is clearly shown that no bacilli are present.

To my knowledge it is the common custom in some localities to rely entirely upon a clinical diagnosis in diphtheria, and to raise the quarantine when the patient seems to have recovered, no cultures being taken at any time. May we not ascribe the continued existence of epidemics largely to this cause?

THE CONTROL OF COMM DISINFEC

BY MR. JOHN
Syracuse Medic

The aim of this paper is to rehe disinfection. Disinfection is use covering the destruction of disease- disease germs themselves. There cussion as to the exact value of disi but if it is going to be done at a thorough and economical manner? can be divided into three parts, th by gaseous disinfection, the destruct and liquid disinfection.

DESTRUCTION OF DISEASE GERMS

Here the destruction of the a wanted. The best gaseous disinfec powerful germicide, but is non-pois expensive furnishings of a room, cloths. Sulphur is also used as a fu backs. It is claimed to be injuriou bleaches some vegetable-dyed wallp and possibly weakens the textile str The germicidal power of sulphur the efficiency of formaldehyde. Sul according to Geddings, has no effec are several other gaseous germicid chlorine and oxygen. Hydrocyanic life to be used in ordinary places, an the other gases are too uncertain in

After going through the list of ga that formaldehyde is the best and mo the questions arise—What is the be

maldehyde? How shall we conduct a formalehyde fumigation? Professor Rosenau says that the secret of successful disinfection with this gas is to obtain a large volume of gas in a short time. Let this be kept in mind when choosing the source of formaldehyde. There are many proprietary products on the market costing from 15 to 50 cents apiece, which are said to be sufficient for 1,000 cu. ft. The principle of most of these apparatuses is the liberation by heat of formaldehyde from solid formaldehyde, called paraformaldehyde.

A number of these proprietary products have been tested out this summer, the method of testing being by generating the gas from the apparatus according to its directions in a room containing exactly 1,000 cu. ft. A known amount of air was drawn at different intervals from the room during fumigation and this air analyzed, quantitatively, for formaldehyde. The results of these experiments give the actual value of the apparatus. Besides testing these proprietary products a test has been made of 40 per cent. formalin mixed with potassium permanganate. The amounts used and the proportion were taken from the results of M. L. Holm and E. A. Gardner in the *Journal of Infectious Diseases,* Vol. VII. 1910. The amounts used were three ounces (90 cc.) of 40 percent. formaldehyde and 2.1 ounces (63 gms.) of potassium permanganate per 1,000 cu. ft. This gives a ratio of ten parts of formaldehyde to seven parts of permanganate and in this proportion less formaldehyde is lost in the chemical action.

FORMULA	Amount destroyed in reaction	Amount remaining in residue after 30 min.	Amount available for disinfection.
1. Formalin 10, $KMnO_4$ 7	30 per cent	3 per cent	67 per cent
2. Formalin 10, $KMnO_4$ 5	22 per cent	20 per cent	58 per cent
3. Formalin 10, $KMnO_4$ 3⅓	15 per cent	45 per cent	40 per cent
4. Formalin 10, $KMnO_4$ 2½	11 per cent	59 per cent	30 per cent

In comparing the amount of form
permanganate method and the propri
results were obtained:

Johnson & Johnson, small size........ .
Johnson & Johnson, large size...... ..
The International Germ Destroyer......
Depree's Fumigator .. ..
Mixture of formaldehyde and permanganate

This may be expressed in percent

Formaldehyde and permanganate.... ....
Depree's Fumigator ....
The International Germ Destroyer......
Johnson & Johnson, large size.........
Johnson & Johnson, small size............

Formosal Fumigator, put up by
pany, has been partly tested, but the
it would be hard to compare it with t

It was found that none of the pr
as much formaldehyde as the perman

In choosing the source of formald
amounts are used every year, it is l
most formaldehyde for the least
method costs about eight cents per 1.
from fifteen to fifty cents. Beside
method the gas is liberated in a very
proprietary products require even
hours.

Having chosen the source of the
of how to fumigate can be taken
required to fumigate a bedroom, a
Stretch a clothes line across the roo
be hung bedcloths, towels, etc.
and expose all the furnishings in th
Make the room as tight as possible
doorcracks with strips of paper m
sugar and water, closing the registers.
Estimate the number of cubic feet in t
already given of permanganate and f
cu. ft. or if using one of the prop
ing to directions. Put the permanga

one, on the floor, and pour onto it quickly the formaldehyde. Leave the room immediately and seal up the doorcracks. Before putting the formaldehyde onto the permanganate, be sure everything is in readiness to leave the room, for the chemical action starts quickly and all the formaldehyde is liberated in a very short time. Two hours is ample time for exposure. Undoubtedly all the micro-organisms are killed in a much shorter time, but for penetration a longer period is better. From experiments already conducted I have killed typhoid and prodigiosus string-cultures and typhoid imbedded in egg albumen in from five to forty minutes exposures.

The question of the relation of the humidity of the air to the germicidal power of the formaldehyde is not yet answered, but from the experiments already completed it is evident that humidity from fifty-nine to ninety degrees, makes no marked difference in the germicidal power of gas. It is possible that below 60 degrees, there may be some marked difference in the power of the formaldehyde according to the temperature.

At the end of the exposure the room is opened. Aqueous ammonia can be sprinkled around the room to take up the formaldehyde gas, but the ammonia in combining with the formaldehyde may later give up the gas on heating the room. The mattress should be either burned or sent where it can be treated with live steam under pressure. Books in the room should be either burned or further disinfected. Beebee's carbogasolene method is considered the most practical. The books are immersed in a mixture of gasolene and 2 per cent. phenol for twenty minutes, then placed before an electric fan for two minutes. Let them set on end for forty-eight hours to dry.

Although formaldehyde gas has a high efficiency as a germicide, it is not a good insecticide. Formaldehyde gas has but little power over insects and vermin, such as rats, mice, flies, mosquitoes and bedbugs. In case of diseases carried by insects, formaldehyde is not the thing to use and this is one point which is so often overlooked. A substance that is a good germicide is not always an insecticide; some substances are merely deodorizers. Popular opinion is formed too often on the odor of a disinfectant rather than on its actual merit as a disinfectant. In controlling a con-

tagious disease, the first step is to fi
or one conveyed by insects. If it i
formaldehyde gas. If it is an insect
is the thing to use.

DESTRUCTION OF DISEASE-C

This topic not only covers the di
other insects and vermin that have t
is one of the most valuable insecti
kill bedbugs, mosquitoes, flies, flea
stance is thus very valuable in fight
plague and yellow fever. I have ma
dioxide to determine how destructi
a room. Five pounds of flowers c
1,000 cu. ft. room for twenty-one h
burned. In the room were expose
wallpapers, cotton, linen, and other
ting, carpet material, feathers, silv
the wallpapers, containing vegetabl
this time none of the cotton or li
The metal was tarnished, except o
been covered with a coat of vaseli
experiment that sulphur dioxide w
furnishings.

Now the questions arise as before
the sulphur dioxide and how to con

Flowers of sulphur is the cheap
phur. There are several methods
such as the pot method, liquor sul
furnace. I will describe in detail
because it is the best and cheapest
used. It requires only the sulphur
alcohol. Calculate the number of c
five pounds of sulphur for every 1,0
mately a five per cent. solution of
phur in a pot, spreading it out to
ness. Make a little crater in the ce
This is to have a place to light t

a tub containing water as a precaution against fire, and to produce moisture. The moisture is essential to kill the bacteria, but it is not necessary to kill insects because the insects already contain moisture. Using five pounds of sulphur per 1,000 cu. ft., Prof. Rosenau claims that two hours' exposure is ample for the destruction of all insects. I have not been able to burn up five pounds of sulphur in less than twenty hours. Place the prepared fumigator on a table. The higher up from the floor the better, as sulphur dioxide is heavier than air and therefore tends to fall. Twenty-four hours are none too long for disinfection for germs. Sulphur dioxide has a good penetrating power. Mosquitoes have been killed when covered by many thicknesses of cloth. Sulphur dioxide is a valuable disinfectant as well as formaldehyde gas, but they are not interchangeable; one is an insecticide and the other is a germicide.

LIQUID DISINFECTION

In the whole field of disinfectants I believe that the liquid disinfectants are the most important. In fumigation we are dealing with possibilities, or at the most with probabilities; but in liquid disinfection we meet the certainties. We have to deal directly with the infectious material itself. The latitude of the usefulness of a liquid disinfectant is almost unlimited, from the sterilization of the surgeon's rubber gloves to the purification of a well.

There are many chemical solutions that are used as disinfectants. Their efficiency varies about as much as the number of kinds. Some liquids are appropriate for one kind of disinfection and have no power when used on other materials; for example, bichloride, which is a powerful germicide, in inert when used on albuminous matter.

Again the same questions arise — What disinfectant to choose and how to use it?

Among the well known and substantial disinfectants are the following: bi-chloride, carbolic acid, formalin, and the coal tar preparations.

Bichloride of mercury, commonly called corrosive sublimate, is a strong germicide except in the presence of albuminous

matter. A solution of 1 to 1
of bichloride of mercury in ei
infectant for nonspore-beari
should be kept in glass conta
metals, and should contain a
chloride should not be used
renders them brittle. Bichlor
animals and therefore should b

Carbolic acid is a well kno
large extent. It does not coagu
it destructive to colors, fabrics
for the disinfectant of excreta, s
cent. solution of carbolic acid
water to a pint of melted phen
ficient for ordinary purposes, bu
kill tetanus and anthrax spores.

Formalin is a watery solut
strength formalin contains 40 p
Formalin is a valuable disinfect
than bichloride, as it can be use
matter. It is a good deodorizer,
toxic. A 4 per cent. solution is
tion of bichloride in strength an
tion of carbolic acid. Formalin
depend on its strength indefinitel

Besides these old and well kn
day many new liquid disinfectants
are products of coal tar distillatio
as germicides and others very low.
prietary products are going to ta
of the old standbys like carbolic ac
mined which ones are the best from
a strong germicide? Is it toxic?
cheap? Many of these so-called ch
value based on their odor, and the a
product is a germicide, insecticide
poisonous. People are led to believ
the solution is a good disinfectant.

The liquid may be a good deodorizer and at the same time worthless as a germicide. One salesman, not long ago, told me that although their disinfectant was labeled a good germicide, it really had power only as a deodorizer and that was all the public wanted anyway.

In choosing a liquid disinfectant, it is wise to get the one that has the highest efficiency for the least money. At present the best method for determining the efficiency of a chemical disinfectant is by determining its phenol coefficient. This means the comparison of a disinfectant as a germicide with a standard 5 per cent. solution of carbolic acid. Carbolic acid being constant is used as a standard and all other disinfectants are compared with it. This method, originally devised by Rideal and Walker, is carried out by exposing a definite amount of a typhoid culture to different dilutions of a disinfectant for different lengths of time. Then repeat the experiment using the phenol dilutions. This result gives us a figure which represents the approximate strength of the disinfectant compared with carbolic acid. Many of the chemical disinfectants have been tested by this method and a surprising variation in value is seen.

List taken almost entirely from the Hygienic Laboratory Bulletin No. 82.

Liquid disinfectants with their phenol coefficients:

Phenoco	15	Car-Sul	2.00
Hycol	12.3	Phenol liquid (U. S. P.)	1.77
Pyxol	11	Saponified Cresol	1.63
Chloro-Naptholeum	6.06	Zodone — Number Four	1.62
Creo-Carboline	4.03	Bacterol	1.58
Kreso	3.92	Carbolozone	1.48
Cabot's Sulpho-Napthol	3.87	Lincoln's Disinfectant	1.48
Hygeno	3.56	Carbolene	1.36
Phenosote	3.43	Phinotas Dist.	1.37
Creolin-Pearson	3.25	Kresota	1.26
Cremoline	3.21	Rudisch's Creolol	1.24
Tarola	3.12	Benetol	1.23
R. R. Rogers' Disinfectant	3.03	Kreotas	1.10
Liquor cresolis compositus (U. S. P.)	3.00	Dusenbery's Creoleum	1.00
Cresoleum	2.90	Kretol	.92
Crude Carbolic	2.75	Electrozone	.9
Trikresol	2.62	Phenol Disinfecting and Cleansing liquid	.61
Napthalene	2.5	Creola	.52
Zonol	2.37	P. H. liq. dist.	.48
Zenoleum	2.25	Veroform Germicide	.43
Kresolig	2.18	Sanitas	.30
Lysol	2.12	The 20th Century Dist.	.30
Germol	2.12	Pino-Lyptol	.27

Formacone liquid ....
Killitol ....
Listerine ....
Phenol Sodique ....
Dioxygen ....
Antozone ....
Platt's Chlorides,

It is often well to kno
its germicidal power.
whose toxicity compared
Worth Hale of Washing
Toxicity studies with c

Phenol ....
Tri Cresol ....
Cresylane ....
Kresalig ....
Lisapol ....
Lysol ....
Bacterol ....
Pheneco ....
Hycol ....
Benetol ....
Creso Carboline.........

Here is an example of th
phenol coefficient. The health
ical disinfectants by the barrel
time. In testing this out it w
of not quite one. Compare th
the market that has a coefficien
infectants sell at about the san
would take fifteen barrels of th
equal in value one barrel of the
ical standpoint, the value of the
former.

Having chosen the disinfectant
question comes up — how to use i
as disinfectants the liquid should b
the material to be disinfected. T
infected object, when possible, in t
not practicable, as in disinfecting
the object should be undertaken, ei
with a broom.

In cases of contagious and infectious diseases the most important point to prevent the spread of the disease is the disinfection of the excretions of the patient. All discharges from the mouth, nose and eyes should be received on cloths or handkerchiefs and either burned or immersed in a good disinfectant. All excreta should stand for an hour in an equal amount of a good disinfectant before allowed to go into the sewerage system.

In summing up the subject of disinfection I want to emphasize these points: 1. In fumigation of a room after germ diseases use formaldehyde gas. The best and cheapest source of formaldehyde is a mixture of formalin and potassium permanganate. A two-hour exposure is sufficient.

2. In fumigating against insects and vermin use sulphur. Flowers of sulphur is the best source for the sulphur dioxide. Care should be taken in using sulphur where there are expensive furnishings and metals. Two hours' exposure is sufficient.

3. Liquid disinfection is highly important. There are many chemical solutions on the market used as disinfectants. Some have a high efficiency, others have little. Choose the one that is known to have a high germicidal power and is applicable to the proposition at hand. Do not take it for granted that a certain chemical solution is the best until it has been tested and its actual value determined.

DISCUSSION

DR. MILTON E. GREGG (Elbridge, N. Y.)— I regret that owing to the late hour of arrival of my train, I have been deprived of hearing most of the very interesting program arranged for this morning.

The village and town health officers in this section of the Conference represent some 2,000,000 or more people. We have still in the open country and rural hamlets in the Empire State, exclusive of the cities and incorporated villages, a population of 1,700,000. It is of the greatest importance to preserve this population at the highest possible degree of efficiency. A French writer and investigator has concluded that dwellers in cities become sterile at the sixth generation, this sterility being an expression of degeneracy caused by the urban environment. This being the case, in order to maintain our civilization and our institutions, we must have the pure stream of healthy and vigorous rural life.

The subject under consideratio
problems as we view it in the ligh
part played by human carriers in t
has received much attention since w
How to deal with the human carri
lem, it seems to me, to be conside
case which recently occurred in m
this fact:

In January, 1912, a case of dipl
old schoolboy. The family was q
antitoxin, and the other members
ing doses. A few days later an ol
showing that 500 units, the amoun
sufficient to immunize in all cases.
days gave a negative report in the s
first. The family being poor, it wa
antine, allowing the father to retur
a positive report was kept strictl
a period of seven weeks, when he w
About this time several other case
teacher of the primary grade.

On consulting the school register,
veloped the disease the next day af
school, but one of the other cases d
previous to his return, so that one or
must have been in the school. The
immunized and the little epidemic a
new baby arrived in the family whe
This baby developed diphtheria wh
Culture from the nasal cavities and
family resulted in finding two carri
year-old boy who contracted the dis
was not until some time in July th
second negative culture from the bo

How can these cases be cleaned
France, proposes the sterilization of
hot air, because the mucous membr
perature than the bacillus can. Dr.
this city, has succeeded in clearing u
riers by autogenous vaccination. He h
with apparent success in these cases

The method of Schiotz, that of
germs with cultures of the staphyloc
and practical. A culture is spraye

atomizer into the nasal passages and into the throat. These twenty-four-hour cultures are easily made, and no doubt the method will soon be in general use. Let me say in passing, that certain eczematous conditions of the skin are proven to be really due to the presence of the diphtheria bacillus and the skin lesions have cleared up under antitoxin treatment.

It has been estimated that about 2 per cent of school children are carriers ordinarily, and during epidemics a much larger percentage is found to be carriers. It is also worthy of note that children under ten years are much more likely to become healthy carriers than those above that age.

A word with reference to sewage disposal in rural communities. The hotels in rural villáges, along important automobile routes, are receiving new patronage. In many instances the proprietors seek some method of sewage disposal, but it seems to me that the methods now being used in many instances are not sufficient. The septic tank is constructed of concrete with a central division. The discharge from the tank goes into a cesspool, a well 10 feet deep. This is situated 100 feet away from the village pump in gravelly loam soil.

DR. WILHELM DREYFUS — I appreciate very keenly the permission to say a few words here. Although I do not share with most of you gentlemen the distinction of belonging to the official family of public health workers, yet, on account of my chemical experience extending over this field, some of my remarks may be of interest to yóu.

Mr. Rice has presented his subject to you so ably that little remains for me to say.

There is no doubt that for room fumigation formaldehyde is the ideal product. There is still some doubt as to the best form in which to apply it. The formaldehyde-permanganate does not give as uniform results as is generally expected. In the city of Pittsburg in the early spring, Dr. Edwards and Dr. Madison of the local health department, carried on extensive experiments. Dr. Edwards said he had used as much as sixteen ounces of formaldehyde and eight ounces of permanganate and had failed to sterilize. They are using exclusively commercial candles; as they claim they are more convenient and compare very favorably from an economic standpoint.

As you know in formaldehyde there is a waste by chemical decomposition of 50 per cent or more. The great trouble in Pittsburg is that the inspectors who actually have to do the disinfecting refused to use the formaldehyde-permanganate, as they claimed their health was injuriously affected. They seal the

room, and the reaction
they cannot leave the
very much depressed,
department is depende
comfort somewhat.

Another point that I
gation you have to use
after the pail, which is
the pail or incur its los

I personally feel that
solution, the American
a committee on standa
methods, and settle defi
health board, national, a

Regarding insecticide
one of the most effectiv
the best way to use it is
burning of sulphur at
inefficiency is shown by
half an hour or an hour,
solid block and stopped
on the market and som
sulphur and charcoal to
mixture of the SO_2 and t
results. Besides, the ap
the sulphur compound, a
the space.

Of course, the most i
local disinfectants; and in
the subject very thoroughl
application of chemical
that the time has come v
requirements as to their ba
about three years ago we l
privilege of reading a pap
Association at Richmond u
logical test. At that time
tion Committee consisting
son, the director of the Ba
States Public Health Servi
and Dr. McClintock have
Laboratory the phenol coe
and which at the last meeti
adopted as the official met
Association.

In Europe they have been working on this subject for many, many years, but so far have not reached any definite conclusion. With the exception of Belgium, there is not a single government in Europe that has regulated the sale of disinfectants. The importance of the subject, however, is such that at the last two congresses, the International Congress on Hygiene and the International Congress of Chemistry, both of which were held in this country last September, an International Committee was appointed to develop and regulate the bacteriological testing of disinfectants.

Another very important work of the United States Public Health Service, to which Mr. Rice has referred, is the testing of over fifty commercial disinfectants on the American market in the Hygienic Laboratory, as reported in the Bulletin of the Hygienic Laboratory of the Service. The results disclosed that, whereas there are many efficient and reliable products on the market, the larger percentage of them do not deserve the title of "Disinfectants."

The Federal Insecticide Act, passed in 1910, watches carefully over the statements and claims made by manufacturers; but this act has control only over those products in interstate commerce. There is no control over products sold exclusively in any particular state; and I think it is therefore of the utmost importance that every state department of health should use its influence with its state legislature to secure laws to regulate the sale of disinfectants in every part of the state, and compel the manufacturers to state on the label of the package and in their "literature" the bacteriological efficiency of the product which he markets. A few states have already taken such steps and have put through such laws. The latest of them is the State of Kansas, where about two weeks ago, I think, the law was passed regulating the sale of disinfectants; and I hope you gentlemen will endeavor to see that similar laws are passed in the Empire State.

The coal-tar disinfectants are certainly the proper means to enable the sanatarian to solve the difficult questions which are presented to him. I think the time is already here when the coal-tar disinfectants and carbolic acid and hypochlorites of lime and such things are the general products used by the health officers. The coal-tar disinfectants are readily solvent, less toxic than any I have mentioned, and above all, they act as thorough cleansers, and the good ones are very reliable insecticides, as Mr. Rice pointed out, which is a very important point, as most of the diseases have been proved to be transmitted by insects and vermin of all kinds; and I think from that standpoint we have to give the palm to coal-tar disinfectants. But, gentlemen, in order to

do away with the
have to regulate by

Dr. Bullard —
and up-to-date ma
dealt with a serio
told us what efficie
of the State of Ne
doing good work, it
animated by the spi
they are supported b
call for the work, o
nected with disease
officers realize the im
There is a certain
Occasionally a person
or go to hear a lecture
I believe the time
when the health office
health laws and a dif
ment to the end that w
at hand and get paid
doing the work gratuito

Dr. Hallenbeck —
county organization as m
Ontario county has an
have nineteen health offic
year. The outcome of th
Laboratory and an Ontario
county tuberculosis hospit
the first laboratory of this
is all the outcome of the
At the meetings one or tw
the matter of public health
doing that, we have no tro
keep our visiting nurses goi
month and in that way get so
Dr. John N. Hurty (In
the discussion of disinfectan
fact that formaldehyde does
It will not do to disinfect a
maldehyde. There is so muc
it is not destroyed by the form
thorough airing, washing with

In regard to school hygiene, one word — there is more harm done to school children by the penny candies and harmful nutrition given to them, than from all the infectious diseases they suffer from. The fact is they would have very few infectious diseases if the children were well oxygenated all the time and well fed. If a child has been coughing, it has not had enough air and is not properly fed. That is all there is to it.

With regard to Dr. Lumsden's remarks, there is this to be said about typhoid fever, that when we get tired of eating and drinking human sewage, we shall not have it any more. So we must take care of human excreta, all human excreta, all of the time, and always, in a sanitary way. Then, exit typhoid! I heard Dr. Stiles say that the difference between the Southern farmer and the Northern farmer was this, that the Southern farmer ate his own excreta and that of the negro; while the Northern farmer ate his excreta and that of the foreigners who worked for him. Simply take care of human excrement in a sanitary way, and the whole question is removed.

May I take the time for one instant to read you a little bit of an article that is an Indiana product, which is for the purpose of bringing before the people the importance of prevention versus cure? It is possible for us to say that "cure" has never added anything to the human race.

FENCE OR AMBULANCE

'Twas a dangerous cliff, as they freely confessed,
  Though to walk near its crest was so pleasant;
But over its terrible edge there had slipped
  A duke, and full many a peasant;
So the people said something would have to be done
  But their projects did not at all tally.
Some said, " Put a fence on the edge of the cliff,"
  Some, "An ambulance down in the valley."

But the cry for the ambulance carried the day,
  For it spread through the neighboring city;
A fence may be useful or not, it is true,
  But each heart became brimful of pity
For those who slipped over that dangerous cliff,
  And the dwellers in highway and alley
Gave pounds or gave pence, not to put up a fence,
  But an ambulance down in the valley.

"For the cliff is all right if you're careful," th
"And if folks even slip and are dropping,
It isn't the slipping that hurts them so much
As the shock down below when they're stop
So, day after day, as those mishaps occurred
Quick forth would these rescuers sally,
To pick up the victims who fell off the cliff
With the ambulance down in the valley.

Then an old sage remarked, "It's a marvel
That people give far more attention
To repairing results than to stopping the
When they'd much better aim at preve
"Let us stop at its source all this mischi
"Come, neighbors and friends, let us
If the cliff we will fence, we might alm
With the ambulance down in the val

"Oh! he's a fanatic," the other rejoin
"Dispense with the ambulance? N
He'd dispense with all charities, too,
No, no! We'll support them forev
Aren't we picking folk up just as fa
And shall this man dictate to us?
Why should people of sense stop to p
While their ambulance works in t

But a sensible few, who are practic
Will not bear with such nonsens
They believe that prevention is bet
And their party will soon be th
Encourage them, then, with your
And (while other philanthropi
They will scorn all pretense and
On the cliff that hangs over the

Better guide well the young tha
For the voice of true wisdom
To rescue the fallen is good, bu
To prevent other people from
Better close up the source of t
Than deliver from dungeon
Better put a strong fence 'rou
Than an ambulance down i

DR. VAGENT (Red Hook)— I would like to tell the members of this body what a village board of health consists of. A village board of health is appointed by the village president, and is composed of lay and citizen members and the village health officer. Now, what are the duties of this body? They are supposed to meet. Do they meet? I was appointed last July to the village board of health, and that village board of health has not met since then. Why not? It is composed of lay members, as I say, and I have been there at the meetings supposed to have been held, but the others did not show up. Now, why is that? It is because there is no pay attached to it. It seems to me this is the proper time and place and the proper audience to draw up suitable resolutions for presentation to the State Board of Health endorsing a change in the personnel of the boards of health of the rural districts, placing then in larger communities and with adequate compensation.

DR. EVARTS (Romulus)— The last speaker spoke of a village board of health and what it consisted of. I do not belong to a village board of health, but I have, for nearly thirty years of my life, been the health officer of a township board.

How is a township board of health constituted or constructed? It is constructed under the laws of the State of New York, and we come here to these conferences and get filled with enthusiasm, and get filled up with knowledge on sanitary measures, and we go home and try to carry out such things — but where do we get any support? The town board of health consists of a justice of the peace, and the town clerk, and a citizen member appointed by them. When those justices of the peace are elected, no thought is given to the fact that they are men who are to participate in other work, and to exercise judgment in the great problem of public health. They are elected generally simply with a view to issuing a summons or a warrant, and little is thought of their fitness for this other service, which is the most important of all their duties, this problem of health. They do not have the least conception of it, until they are educated by the health officer; and the law says that they shall appoint a health officer and fix his compensation.

We come here and we hear from the rostrum the declaration that health officers are too poorly paid; but the law says these boards of health shall be the judge of the value of the health officer's services. They do not meet more than once a year unless something special calls them together. The law further states that they shall direct the health officer in the discharge of his duties. Why, gentlemen, I have had members in my board

of health who would come there and propose that they sh direct me how to start fumigation, and to quit quaran under some circumstances. My only reply was, "Gent pass that and I will report it to the State board for ap That generally made them sit back and shiver, but it is mind that it should be done. I have in some years had of the board, a majority of whom would be in favor just as little as they can. To speak of when the boar we had an annual meeting. It was held in January a special meeting thereafter when a serious epidem vailing over in the village of Willard, and those were ings of that board. I tried to get them to get togeth said, you go on and do that; we are farmers, or something else. When the board of health meets, a town program and they meet as a town board hold a meeting as a town board so they can dr a day; and then they turn in and adjourn as a proceed to organize as a board of health. If of their time, they cannot give it to me; they t to go home and do their chores. The fault lie class of men designated by law to pass on the pensations of physicians. Many of the membe believe that where the law says they shall di cers, he shall do nothing but what they direct ter what the state laws and sanitary laws They take very little time to investigate the and they think they are the whole thing.

DR. TOWNE (Schenectady)— I want to s carriers. In Schenectady we had one of t had raised the quarantine. He was disco it was a child, and a culture was taken of years old and who had not been sick, whic tory and the report came back "positive or four more cultures in the course of reported "positive." Then our own ba culture of streptococcus, an attenuated thin spread of that on the throat and reported "negative." To check that in forty-eight hours and that also was eventually we raised the quarantine. is something in this.

DR. ——— To go back to the qu ganization is all right, but the probl

not what the town board of health will do. The average town board of health that is gone after with a club, returns with a club. But if you convince it that a thing is essential, I believe the average board is back of you. Organization is all right. Lots of these measures talked over are interesting and all right; but the question is what shall we do when confronted by a peculiar situation? The question has been asked direct, relative to sewage disposal, and it is a condition which probably confronts 75 per cent. of the village health officers here.

DR. YOUNG (Newark)—I worked on this sewage problem until I was disgusted with it. I want to call the attention of people here to the fact that we think we have a very good system worked out at Cornell University, from which you can get instructions if you write.

DR. LUMSDEN.—I think the best test of the usefulness of a paper or an address is the discussion which follows its presentation; and I feel very much gratified at the discussion which has followed the papers presented here this morning.

I was very glad, indeed, to hear from one county in New York State such an encouraging report as to its health work and its county organization. I was also glad to hear of the practical points brought out by the organization of the town or village board of health. I can realize how a member of the town board of health who had direction over a health officer who was trying to get the milk supply straightened up, if the member of the board happened to be engaged in selling dirty milk at a profit, I can understand the possibilities there. Also, if an undertaker was appointed on that board. But, I think the main point is brought out by Dr. Hurty's discussion, where he said that the real point was not to have an ambulance in the valley, but to build a fence on the cliff.

We have got to get the people to agree to build a good fence, not a rotten fence, nor a one-rail fence. They must determine what kind of a health officer they want. The health officer can help to get a good fence built. At a meeting of the State health officers in the State of Tennessee a month ago, a young man recorded that he had started out on the most munificent salary of $100 a year. How much health work should those people expect in that town? How much of service or cure or prevention would they expect from a practicing physician for $100 a year? What town or village would have the courage to face a reputable physician and ask him to come and treat their village sick for $100 a year? Yet, that is what they asked this

village officer to do for $100, and in some other places th
but $200 a year. You cannot get a good "fence-buil
that sum. I think that is the whole secret of the bus
must be put clearly before the people. Ask them wh
a fence they want built, and how much fence, and wha
pay for it.

THE CHAIRMAN — The next paper this morning is "How to
ment in Rural Hygiene." It is by Professor Ogden of Corne

HOW TO EFFECT IMPROVEMENT IN RURAL HYGIENE

By Prof. H. N. Ogden, Cornell University

Special Engineer, New York State Department of Health

I have been asked to talk to you on the subject "How to Effect Improvement in Rural Hygiene." If you boil that down and get the meat out of it, I take it to mean: What is the country health officer going to do to increase the public health in a farming community? What are you individual health officers to do this particular winter to improve health conditions in the communities where you live?

Before I take up that part of the question I want to say a few preliminary words as to the problem there.

In the first place let me disabuse your mind of any misapprehension that I am a farmer. I am not. I was neither born nor brought up on a farm, as so many great men are, and I have not lived on a farm, so I know nothing of it from a practical standpoint, and, if I did, I doubt that I would have the presumption to come to this audience and describe to you the conditions of farm life, as I take it most of you are village or town health officers, and that in the course of your life you have come in contact with the methods and habits and conditions that prevail among those living in farming communities. It would be presumptive indeed for me to describe farming communities to you.

Passing from that fact, let me say that what I have to tell you comes from two sources. My first information arises not from the fact that I am a farmer, but from the fact that I have studied somewhat the statistics which the State Department of Health collects. I know those are very uncertain things to base any opinion on. But what are we to do? The state collects them; they are in Albany in great piles, and we must make some use of them; and I will take from those piles of statistics a few facts, as I have seen them. The second information I have, comes from association with the State College of Agriculture at Cornell University, where an intimate relationship is being established between that institution and the farming community.

The first point I would make is that the problem of ru
tation in New York State is not as pressing as it is in so
states. In the United States as a whole, one-half the p
lives in the country and the other half lives in the city.
of our western states such as Kansas, Iowa and others,
ters of all the people are rural residents; and therefor
tation is there greatly to be considered. In New Yor
15 to 20 per cent. live in the country, and 80 per cen
To be sure, that is about two million people, but in
does not sound very much.

The next point I make from the statistical st
present death rate among country people is decide
in the cities. The country people are at an adv
the death rate is a guide or indication of health
difference in death rate amounts to three or fo
people, and so far, it would indicate there was
education in sanitation in rural communities.

There are two reasons, however, why we must
try as well as the city: In the first place, the ci
creasing very rapidly, and soon will be as low
The city health officers are on to their jobs, s
are doing good work, and the city people are
is nothing more creditable to our city health
administrations than the fact that the death
due to your work; since 1895, to give you th
dropped in the state from 19 to 15. But it
country is not improving at all. That is n

In the next place, it is not satisfactory
the death rate is due to the deaths of child
dren there are in a community, naturally
death rate. In the country there are not a
are in the cities. Statistically, it is a fa
many children in the country as there are
sanitary conditions being identical, the
be less, just because there are not so man
is any advantage in the open air treat
uncongested conditions, then that is ano
try death rate should be lower.

Last year in New York State the deaths from old age seemed to show again that the country was the place to live in. In the State as a whole, 26 per cent. of all the deaths were over 60 years of age. In the country, 50 per cent, more than one-half, of all the deaths were over 60 years of age. What better could you want? A man lives to be 60 years of age, and one-half of all the deaths in the country are of persons over 60 years of age. Is not that a pretty good condition of sanitation in the country? The flaw in all this is that most of the people in the country are old; the young people come to the cities, getting tired of country life, and so that means that they are the only kind of persons left out in the country to die.

Another point: Contrary perhaps to some theories or impressions, the death rates from infectious diseases in the country are decidedly less than in the city. As was said from this platform this morning it is not a question of health in the country or of combating infectious diseases. We do not have them there; occasionally you get a typhoid case here or there. And so the infectious diseases do not spread in the country and the people there die ordinarily of constitutional diseases, liver trouble, kidney trouble, cancer, and throat and lung difficulties. Where do these ailments come from? They come from lack of knowledge and instruction in personal hygiene.

Therefore, if I have learned anything from these statistical studies, if you want to improve the health of people living in the country, you must teach them the right methods of living, and not start out to stop epidemics, as there are none. They must not feed the baby, who is one year old, with bananas, as I saw a mother doing a short time ago; the child was crying from its discomfort, and every time it cried with pain, the mother rammed another piece of banana down its throat. You must teach farmers the necessity of right ventilation, and also teach them to give their boys and girls time to play. They should not be kept at work so constantly. It is instruction in personal hygiene that is necessary in the country districts.

How shall we do that? I have four methods.

The first is to make use of the country granges. In every county in this State there are from one to twenty-five separate

granges; and the more rural the grange is, the better the standard becomes, as I understand it. In those communit present papers and have discussions at their meetings, a of the best work the granges has done, has been in connec the establishment of county tuberculosis hospitals. I sug you get in touch with the lecturers of the town or coun and tell them you want to appear at some of the grang luring the coming winter; and you must tell the pe grange then some of the things they should know. Pr straight.

Then make use, next, of the rural county schoolh is a tendency throughout the more enlightened dis the schoolhouses open in the evening and have a where some of the children can speak their little farmers' wives can come and get some little socia At these meetings the health officer is due to talk hygiene, and he can do it through an agreemer school commissioner, who is usually eager to powers he has.

In the third place I should suggest making teachers. It probably would not be worth w officer to go around to the different rural sch is no reason I know of why he should not teachers at his own home or some centrally l before them some points of health and pers is no better way of passing on knowledge of ducing it through the schoolhouses.

Then, lastly, in the rural churches. Th in the country taking their places of leader of the community, and there the health off opportunities to talk on rural hygiene.

You say, possibly, "I am not paid for say, "I would not be able to collect any p the evening."

There are two answers to that: One is is the proper man for his position he whether he gets paid for it or not. I was told when I started in on my way i

that success consists in doing what you would rather do more than anything else, and getting paid for it. Now in this case you would do what you like best and get paid for it if you can; and if you can not, do it anyway. The other way of getting around that is to change the organization of the State Department of Health.

It seems to me that if the health officers, who are the subordinate officers of the State Department of Health, cannot be put in the way of doing the obvious thing for which the State Department of Health exists, namely, promoting the cause of sanitation — there is something wrong in the organization. If there is something wrong with the organization, it should be corrected; but certainly there should be some way of connecting up these two different phases of the public health work.

I was very much cheered last week when I had a letter from a health officer of this State saying, "Please send me some literature, as we are arranging a little series of talks in our schoolhouses, for the people, on health subjects, and I think perhaps the circular I am asking for will be of help." Here is a rural health officer doing what I ask all rural health officers to do.

Discussion

Dr. William A. Howe (State Department of Health, Albany)— For the past two and a half years it has been my privilege to come here and meet with many of the rural health officers of the State of New York and with many other physicians of the state, and if there is any one thing with which I agree, it is with the general intelligence of the health officers of our rural communities. I wanted to say a word about Dr. Lumsden's comment on the salary of the doctor in the south, whom he mentioned, who was getting $100 a year as a health officer. I would like to inform Dr. Lumsden that I believe that 75 per cent. of the rural health officers of the State of New York are receiving less than $50 a year for their work. To my knowledge there is a health officer sitting in this room who divides with his board of health $25 each year, which is appropriated annually for his work. In that case the health officer gets $12.50 for his services, and yet he rendered some of the most intelligent work in an outbreak of typhoid. You may talk of philanthropy, there is no greater body of philanthropists in the country than our health officers.

I wish you would all go to the meeting of the New York Sanitary Officers Association this afternoon. That is a n ting place to discover the real character of the services to the community by these men. Last year through th of that organization and the State Department of Hea was a remedial measure passed by the Legislature, wh Governor had given his signature to it, would have health officer fair compensation for his work. It is a legislation. It is a question, as Dr. Freeman said what the people want and are willing to pay for. as health officers, in this State, and as philanthr field of health, the people of the State of New Yor a great deal more than they do; outbreaks of dis on and I hardly dare dream of the conditions wh throughout this country. As physicians and as he are in the business for the love of it entirely. families, and we are looking forward to a cor port our families, and it is no more than natur be interested in compensation.

I was much impressed with the subject of a Hurty, about building the fence on the cliff the ambulance in the valley. That building th is what you gentlemen do, and you do it method of public education in health matters cational factor, you can aid most effectually b ture of the Department. Where you have a disease, see that the family is furnished wit cular prepared by the Department of Healt

Treat the physicians of the community a treat you. Treat the physicians of the ne would have them treat you. In other w where reciprocity in kindly dealing can in the field of public health.

DR. FREDERIC C. CURTIS (Albany)- myself wherein is rural sanitation an from that of the city? We know ver are before the city — of crowded lives, food and water brought to them from ters. I have an impression that the he to live is in the better part of a city our domestic life which can be surro protection and care. But I would add place to live than in the poorest parts o

The country differs from the city there comes to my mind as I think c

bears upon the general proposition which lies at the basis of this discussion: That is, to have our minds set first on the environment of the disease germ of communicable diseases as it finds itself in the city, as different from the country. And then on the other hand, the difference in the lives of the people must be considered.

The disease germ in the country meets with a different fate from that in the city. In the city we are definitely exposed to it.

I wish to say this one thing about the second of these propositions; that, as regards the people that make up our rural population, they lack what the city has, that is, subordination; there is less readiness to yield to authority. Professor Odgen has emphasized the value of that when he spoke of the matter of education. It is not true that all of you know how much the State Department of Health is contributing to this one matter? I do not know of one subject which Dr. Porter has given more thought to than the preparation of material that the school teacher can utilize. The Department is doing an immense amount of that work. Education of the people is one of the most effective ways in which we can control disease, and the people of the country need that education most.

Dr. Freeman (Of the Virginia State Department of Health) First, I wish to congratulate Professor Odgen on his paper. In the State of Virginia we have 70 per cent. of our people living in the country districts, and we have been working with the people in the country districts, letting the city people take care of themselves with their city health officers. We have endeavored to carry to the people of Virginia the simple truths of sanitation. We have used the farmers' institutes and trains and school inspection, and anything we could get hold of to propagate our work. Last year we delivered 1,000 lectures to something like 120,000 people in the rural districts of Virginia, on "rural sanitation." From Farmers' Institute trains a great deal is done, and our lecturer talks ventilation and other matters of hygiene along with the man who talks corn and potatoes to them.

When we started work in Virginia we had approximately 15,000 cases of typhoid, and last year it was 8,000, and each year it shows a decrease over the previous year. Our tuberculosis death rate is coming down, and there is coming in the country districts a conscious need for health protection.

As I said last night, and as it was emphasized here, we shall never get health protection until the people are educated to the point where they will insist upon it. I think sanitation would advance much faster if we doctors got out of public health, and informed the public that if they wanted public health they should pay for it and get it.

There are a few things we try to teach the people. to teach them about the sanitary work necessary in t hold, and on the farm, the need of ventilating their slee ters and of taking proper food. But anything you d country people is slow work. Their ideas come when they get hold of them they have got them. B got to take into consideration that you must go b domini; you have got to go back there to get them give them lectures on keeping their sleeping rooms w The houses on the line of the New York Central co all seem to be hermetically sealed at this date for th

Then, again, we are trying to get the people throw away their frying pans. These are simp we are trying to get them to adopt.

I am profoundly optimistic about the rural hammering here and there in every nook and co in every hamlet and crossroads; and eventuall come to realize that we have something they wa pay for it.

THE CHAIRMAN — We will now adjourn until to- o'clock.

Third Day, December 6, 1912

THE CHAIRMAN — I think it is a great honor to the health officers of the State of New York that we are able to have with us this morning one of the noted men of this country and of the civilized world. Wherever scientific medicine is known, there the name of Mr. Hoffman is known, and once more I have the pleasure to call upon him at one of our Conferences to address you.

THE RURAL DEATH RATE OF THE STATE OF NEW YORK

BY FREDERICK L. HOFFMAN, LL.D.

Statistician, Prudential Insurance Company of America

The sanitary conditions of rural life are only in part reflected in the rural death rate. Statistics of morbidity would be much more valuable for the purposes of a sanitary survey, but unfortunately no such statistics are available at the present time. That much illness of a nonfatal character prevails among the agricultural population as the result of sanitary indifference and neglect is generally admitted by those familiar with the facts, and even a superficial study of the mortality statistics suggests a most promising field for sanitary reform in the improvement of the health conditions of rural districts throughout the United States. For the present purpose the discussion is limited to the rural death rate of the State of New York, but in a general way the conclusions apply more or less to the country at large.

It is practically an axiom in public health discussions that the health conditions of rural territory are decidedly superior to those of densely populated urban centers. Conclusions of this kind are based chiefly upon a study of the general or crude death rate, which, as a rule, indicates a lesser mortality in rural than in urban districts. It is hardly necessary, however, to point out that the crude death rate may be more or less misleading on account of decided variations in the comparative distribution of the urban and rural populations, by sex, age, race, nativity, and occupation. A thorough statistical inquiry into the subject, however, is most difficult on account of the fact that the elements of the population, as well as the details of mortality, are not made fully available through the official publications of the State, or the division of vital

statistics of the United States census. A
comparison of urban and rural mortality
tion of specific or corrected death rates, b
this has not been feasible on account of
required information is not available.
is limited to the crude death rates, with
gest caution in the acceptance of statem
ject to the foregoing qualification.

In all discussions of this kind it re
that the crude death rate of rural dist
than is actually the case, on account
rural districts to the city, which chiefl
eighteen to forty-five, or of an age peri
rate is considerably below the rate for
of persons aged sixty-five and over is, t
somewhat larger in rural districts tha
the trustworthiness of crude death rate
corrected for age, is much impaired in

The crude death rate of cities is ap
ally is, on account of a favorable age d
of the city of New York, for illustrati
sion of a large proportion of Hebrews
to a low general death rate. The city
creased by the mortality in instituti
rural districts, a large proportion of
higher death rate than natives, and in
account of the relatively high propor
race to an exceptional mortality at all

For the purpose of illustrating the
the nativity and race distribution of
of New York the following table has b
year 1910:

DISTRIBUTION OF POPULATION, REGISTRATION

	1900
White population:	
Native-born	
Foreign-born	
Colored population	
Total	

It is shown by this table that the proportion of the foreign-born is 30.11 per cent. for the cities of New York State, in contrast to a proportion of only 13.4 per cent. for the rural districts. It is further shown that the proportion of negroes is 2.75 per cent. in cities of the registration states against 1.32 per cent. for the rural territory. The distribution of the population by ages in the registration states of the United States is shown in the following table, but for the year 1900, since the corresponding information for 1910 is not as yet available.

AGE DISTRIBUTION OF URBAN AND RURAL POPULATIONS, REGISTRATION STATES—1900
(Standard million)

AGES	URBAN POPULATION No.	URBAN POPULATION %	RURAL POPULATION No.	RURAL POPULATION %
Under 15	292,215	29.28	296,945	29.75
15–44	525,638	52.67	462,231	46.31
45–64	143,508	14.38	172,561	17.29
65+	36,594	3.67	66,397	6.65
Total, ages known	997,955	100.00	998,134	100.00
Per cent. of ages known of total	....	99.80	....	99.81
Ages unknown	2,045	0.20	1,866	0.19
Grand total	1,000,000	....	1,000,000	....

The above table is for the registration states of the United States and not for the State of New York. The proportion of population ages 65 and over is 3.67 per cent. for the urban population, against 6.65 per cent. for the rural. Since the specific death rate at ages over 65 is relatively high, it is obvious that a larger proportion of population this age period must tend to raise the crude death rate more or less above the true rate unless corrected for age.

The total population of the State of New York in 1910 was 9,113,614. The rural population, including under this term all villages and settlements with less than 2,500 population, constituted 21.2 per cent. of the total number of inhabitants. In the census mortality reports, however, which are chiefly made use of for the purpose of the present discussion, the term rural has a much broader meaning, being made to include all cities and towns with less than 8,000 population, and according to this definition the rural population of the State of New York constituted 25.8

per cent. of the total, the actual population
being 2,306,810. It is necessary to take
that the rural territory under this definition
ber of small population centers with conditio
Reference may be made to such well known
with 7,520 population; Norwich, with 7,422;
Hudson Falls, with 5,189; Mechanicville, wit
straw, with 5,669 population, according to
The distribution of population according to
tions of rural and urban territory is shown in t

POPULATION OF THE STATE OF NEW YORK.

Population in cities with more than 8,000 population..........
Population in cities and towns with from 8,000 to 2,500 inhabitan
Population in remainder of territory ....
Total..

The first qualified discussion of the climate and
State of New York occurs in a brief chapter in t
Account of the Climates and Diseases of the U
America," by William Currie, published in Philade
In this discussion attention is drawn to observed
disease prevalence in the cities and rural parts of the
York, briefly commented upon as follows:

"The difference between the constitutions of the
of the city and country parts of New York is almos
Inflammatory diseases are much less frequent in the
the country and, in general, are much less rapid and
progress than formerly; nor do they admit of the
phlogistic methods of care which is found necessary w
whose occupations require exercise in the open air.
farmer with an acute rheumatism often requires the los
or seventy ounces of blood in the course of the disease
citizens confined to a sedentary occupation can seldom
that quantity. The citizens are affected with an enormo
of nervous complaints of which the inhabitants of the
have no idea. These appear to influence all their oth
plaints. Great numbers of them are enfeebled and ene
and it is not uncommon to observe a high degree of irri
under external appearances of firmness and vigor."

Among the causes assigned for the occurrence of nervou

other diseases typical of city life are mentioned "sedentary occupations, the intemperate use of spirituous liquors, and the daily use of strong tea." Of course, at this early period no trustworthy vital statistics were available, and the conclusions express little more than scientific conjecture. A very interesting address on early medicine in the State of New York, to which reference may appropriately be made, was read before the State Medical Society in 1876, by Dr. Wyckoff, of Brooklyn, who pointed out that during the early years of the colonial period fevers of acclimatization seem to have been quite rare, and certainly much less so than in the colonies of New England and Virginia. An equally interesting contribution to the study of early medicine in the State of New York is an address on "The Reminiscences of a Country Doctor during the Past Fifty Years," contributed to the Transactions of the New York State Medical Association, Vol. XI, for the year 1894. In this address it is stated that typhoid fever in western New York was quite unknown during the early period, but that intermittent fevers prevailed to a considerable extent. The author also observes that "it does not become those who jeer at the use of the lancet in that day, when the only reason for doing so is present-day ignorance of the type of diseases which then prevailed." Membranous croup was not common, and diphtheritic croup was practically unknown. Fifty years ago the treatment of a case of consumption otherwise than as a purely inflammatory malady would have been considered the height of ignorance. Bright's disease at that time was practically unknown.

It would carry me entirely too far to refer even briefly to the quite numerous and interesting contributions which, from time to time, have been made to the sanitary history of New York State, with special reference to rural districts. There is an abundance of material in the Transactions of the New York State Medical Society and in the annual reports of the State Board of Health. It is evident that not only have the local conditions changed more or less in their relation to disease prevalence, but it is quite clear that the types of many diseases have themselves undergone a change. Among the more important sources of information reference should be made to an interesting report made in 1861 to the Medical Society of the State of New York, on "Medical

Topography and Systematic Drainage," by th
Harris, and associates, of the city of New Y
there is a brief historical survey of previou
which the following is a concise summary a

In February, 1830, a committee had been a
consideration the best means of making a
survey of the State, and as a result thereof
reports were made between 1830 and 1855
cussion of the medical topography of Onc
local physicians, and another, made in 18
Onondaga county, by Dr. Jones. A paper
agriculture in its bearing on medicine, by
uga county, in 1848. Attention was called
swampy tracts in the upland plateaus and
districts. These tracts were held to be a
to the population of the vicinity. It wa
swampy areas exhibited a considerable
topographical characteristics, but with re
held that they were susceptible of eff
other sources of ill-health, attention wa
adopted by the State Medical Society
the construction of canals and railroa
state had been followed by bilious fe
diseases usually termed malarious, and
Society, much of this evil had resulted
tion of natural watercourses and the
all places where they were required.

Considering at length all of the fa
the sanitary conditions of the rural
prehensive system of state hygiene
ever, was not carried into effect u
the State Board of Health came i
early period, however, Westchester
viously considered intensely malario
matic disorders by systematic drain
followed in the neighborhood of th
Orange county. Other districts o
drained, and a low death rate had

Among the more recent sanitary

lowing are briefly summarized: There was an epidemic of dysentery at Remsen, a village of about 500 inhabitants in the northern part of Oneida county, reported in the Seventeenth Annual Report of the State Board of Health. There were six deaths from the disease, of which four were of children. The epidemic was not a circumscribed one, and there were several instances, in which more than one case occurred in the same family. The village itself was free throughout from insanitary conditions and there was no previous history of malaria or cerebrospinal meningitis. Prior to the outbreak there had been no more sickness than usual. The cause of the disease was attributed to unusual weather conditions, as a probable explanation. According to Dr. F. C. Curtis, "that such an epidemic should occur in this rural community is a matter of considerable interest and is somewhat unique in the history of it."

A malignant epidemic of dysentery occurred in the town of Hartwick in 1897. This is a small town in Otsego county not touched by a railroad. The epidemic occurred during August, the mean temperature was below the normal average, and the rainfall in the early part of the month had been excessive, followed by a week or two of dry weather. At first limited to a single family, there were ultimately fifteen cases, with four deaths. A qualified inquiry was made into the surrounding circumstances by Dr. Lartigau, of the Hygienic Laboratory, and the conclusion was advanced "that the bacillus pyocyaneus was in all probability the causative factor in the production of the epidemic," and that the same must have entered the systems of the persons affected through the medium of the drinking water, but how the water became infected was not ascertained. In the words of Dr. Curtis, "where it came from and how it reached this sink place we may not be in a position to say, but the inference may be hazarded that it was aerially — was brought there in the atmosphere; the defiled earth furnished a soil favorable for its development, aided by the warm, muggy atmosphere then prevailing; and then the frequent rains came and facilitated their passage to the soil." In the opinion of the doctor, "the case furnished a material contribution to the etiology of epidemic dysentery."

That the rural districts are not free from unwholesome conditions resulting from industrial processes, is illustrated by a com-

plaint made to the State Board of Health in 18
nuisance caused by the manufacture of plaster o
lage of Oakfield. The objections were on the
contaminated atmosphere, which, it was claimed
affecting the health of the people. Upon inquir
that the works complained of were so located that
winds continually carried a cloud of calcined lime
of the village, making everything white in its trac
affecting the inhabitants in that section of the vill
extent as to threaten some of them with nervous tro
ness. Whether the nuisance was ultimately abated
shown by the report.

In 1902 there was an epidemic of dysentery in
county, which is briefly described in the report of t
partment of Health for that year. The greatest nun
were in the villages of Tuckahoe, Bronxville, and
The poor and the well-to-do were affected alike. T
curred in widely separated localities and among perso
occupations and ages. Efforts to prove that the wate
ice supplies were responsible for the occurrence were f
tive. After a careful inquiry it was ascertained that th
was one of true dysentery, and that the laboratory inv
of the intestinal discharges in the blood were in accord
the work of those who claimed that the b. dysenteriæ is
of the common form of dysentery, but that no sources of
whatever could be found.

During the last few years reports on sanitary investiga
cities, made by Prof. H. N. Ogden, have been publishe
reports of the State Department of Health, which foreshad
ilar inquiries to be made in course of time into the sanita
ditions of rural districts. The reports by Professor Ogden c
much useful information, but it would seem that they sho
made more comprehensive in the case of particular loc
rather than that a large number of such reports should be
each year.

Even in their present form, however, they constit
useful basis for the study of local sanitary conditions, a
course they can be amplified by those especially interested i
health of particular localities. In all investigations of this

however, it would be preferable to omit elaborate statistical tabulations or comparisons of data for particular cities with data for the several registration states or foreign countries, which of course, can not be conclusive, or of much practical value. For an excellent illustration of a sanitary survey with special reference to the spread of typhoid fever through sewage pollution, see Bulletins number 77 and 83 of the Hygienic Laboratory, U. S. Public Health Service, 1911–12.

It would also be better to make a qualified analysis of the local mortality data with reference to sex, ages, and particular occupations. Only by means of such specialized analysis can the underlying causes of ill-health be disclosed and correlated to the results of a scientific sanitary survey.

A sanitary survey of the State of New York requires as its basis a careful study of the topography and surface geology as well as the soil formations, and surface and underground water supplies. A very interesting outline of the physical geography of the State was published in the bulletins of the American Geographical Society in 1899. Typical geological surveys useful for the purpose of a sanitary survey, are the reports on the configuration of the rock floor of Greater New York, published by the United States Geological Survey in 1905; the report on the geology of the Hudson Valley between the Hoosick and Kinderhook, published in 1904; and the bulletin on the geology of the Elizabethtown and Port Henry quadrangles, of the New York State Museum, published in 1910. Important reports on the surface water supplies are the bulletins on the fluctuations in the water level in wells, especially on Long Island, published in 1906; the normal distribution of chlorine, published in 1905; a preliminary report on the pollution of Lake Champlain, published in 1905; and observations on the flow of rivers in the vicinity of New York, published in 1903. A series of important soil surveys has been published by the Division of Soils, United States Department of Agriculture, which contains much information useful for the purpose of a sanitary survey. Special reference may be made to the reports on the Syracuse area, which include some typical illustrations of swamp lands and the marginal swamps of Onondaga Lake; the report on Niagara county; the report on the Big Flats area, including the city of Elmira; the exceedingly interesting report on Washington

county, which includes an unusually large
variations in topographic features; the repor
and the Long Island area; and finally, Mad
an unusually large variety of soil condition

The general death rate of the rural dist
New York, as returned by the Division of V
Census, for the decade ending with 1909,
against a death rate of 17.7 for the cities o
The rural death rate is slightly in excess of the
for the rural area of all the registration stat
year term was available, and which was given
The tendency of the urban and rural rates in re
York State has been to approach each other, an
ference in the rates had been reduced to 78.4 per
lation. In other words, the rural rate that year v
of the urban rate. As has been previously point
death rates are not entirely conclusive, but appa
sanitary progress can be measured by *the crude c*
has not been the improvement in rural sanitary c
apparently has taken place in the cities of New Y
illustration, the urban death rate of New York
was 19.5 per 1,000, whereas in 1909 the rate was
rural death rate in 1900 was 15.5 *per 1,000, wh*
the rate was 15.1.

It would carry me too far to discuss *in detail, the*
urban and rural mortality from all of the more imp
but in brief the more suggestive contrasts are shown

The TYPHOID FEVER rate, as a rule, has *been h*
rural districts than in the cities, but during recent ye
ferences have been of relatively small *importance. Th*
typhoid fever rate for cities occurred in 1909, when
per 100,000 of population, and during *the same year the*
rate of the decade prevailed in the rural districts, wh
15.3. The maximum rates occurred *in 1900, when the*
to 25.4 per 100,000 of population *in the cities, and 3*
rural districts.

The mortality from MALARIAL FEVER is *relatively of s*
portance. The rate has been rapidly declining durin

years, but throughout, the rate has been higher in the urban than in the rural districts. The maximum rates occurred in 1900, when they were 4.9 per 100,000 of population for the cities, and 3.8 for the rural districts.

SCARLET FEVER is decidedly more common in the cities than in the rural districts of New York State. The range in the rates during the decade has been from a minimum of 11.3 per 100,000 of population, to a maximum of 26.1 for the cities, and from 3.6 to 6.3 for the rural districts. There is apparently no definite tendency towards a reduction in the frequency of the disease in either the cities or the rural districts. In 1909 the rural scarlet fever rate was 29.2 per cent. of the urban.

DIPHTHERIA is also much more frequent in the cities than in the rural districts. The minimum rate for cities was 29.0 per 100,000 of population in 1909, and the maximum rate was 46.5, in 1900. The minimum rate for rural districts was 9.3 in 1909, and the maximum was 16.9 in 1900. There has been, therefore, a decided decrease in the frequency of diphtheria in both the cities and rural districts of New York State. In 1909 the rural diphtheria death rate was 32.1 per cent. of the urban rate.

The mortality from INFLUENZA, however, is much higher throughout the rural districts than in the cities. The range in rates has been from a minimum of 6.0 per 100,000 of population in 1902, to 24.0 in 1901, for the cities; and from 16.0 in 1906 to 60.2 in 1901 for rural territory. In 1909 the rural influenza death rate was 14.6 per 100,000 in excess of the urban rate.

The mortality from TUBERCULOSIS OF THE LUNGS is much higher in the cities than in the rural districts. In part this may possibly be due to important differences in the age distribution of the population. It is largely, however, the result of the employment of males in cities in health-injurious occupations. The tendency of the rate for both the cities and rural districts has been towards a reduction, but the decrease has not been as pronounced as is generally assumed to have been the case. The minimum tuberculosis rate for cities was 170.9 per 100,000 of population in 1909, and the maximum rate was 217.9 in 1900; the minimum rate for rural districts was 116.8 in 1909, and the maximum rate was 137.1 in 1901. The excess in the urban over the rural tuberculosis

death rate in 1909 was 54.1 per 100,000
ferences in the rates are less pronounced
in former years. In 1909 the rural tu
68.3 per cent. of the urban.

There is an equally pronounced di
from TUBERCULOUS MENINGITIS. The c
however, appears to be practically static
rural districts, with possibly a slight ter
The minimum tuberculous meningitis d
in 1905, and the maximum rate wa
rural districts the minimum rate was
mum rate was only 5.5 in 1909. In
meningitis rate was 35.3 per cent. of

The mortality from GLANDERS AND I
AND CHARBON, RABIES, AND ACTINO
other diseases of this class, has been a
unimportant. Since these diseases ha
tact with animals, it is suggestive th
judge, the mortality therefrom is ap
than in the rural districts. The su
more extended inquiry, but on this
considered in detail.

The mortality from SYPHILIS, w
importance, is relatively a most sugg
linquency. The syphilis mortality
in the cities than in rural districts,
rapidly on the increase in the urban
The minimum syphilis mortality ra
maximum rate 8.2 in 1907, per 100
and in the rural districts the minim
the maximum rate was 3.1 in 1909.
from syphilis was 39.7 per cent. of t
in part, the increase in the mortal
parent than real, on account of imp
and care in the classification of jo

The mortality from CANCER OF
been about the same in urban as in
rate for cities was 24.3 per 100,00
the maximum rate was 30.8 in 190

rural districts was 23.3 in 1901, and the maximum rate was 33.4 in 1908. The tendency is towards a gradual increase in the rates in both the urban and rural territories.

The mortality from DIABETES has been much the same in the rural districts as in the cities, but there is apparently a decided tendency towards an increase in the rates. The city rate has increased from a minimum of 11.3 per 100,000 of population in 1900, to a maximum of 16.9 in 1909. The rural rate has increased from 11.4 in 1902, to 16.7 in 1909. The actual increase per 100,000 of population has been nearly the same for both urban and rural territories. It is possible, of course, that the increase in the rates is more apparent than real, on account of improved methods of diagnosis and classification and the larger Jewish population especially liable to the disease, but there are reasons for believing that diabetes is actually on the increase throughout the State of New York.

The mortality from ANEMIA AND CHLOROSIS is higher in the rural districts than in the cities. The minimum rate for cities was 2.8 per 100,000 of population in 1903, and the maximum rate was 3.6 in 1907. For the rural districts, the minimum rate was 4.9 in 1901, and the maximum rate was 8.3 in 1909. The actual excess in the rural anemia mortality rate over the urban rate in 1909 was 5.0 per 100,000 of population.

The mortality from ALCOHOLISM is decidedly higher in the cities of New York State than in the rural districts. The minimum death rate from alcoholism in the cities was 6.1 per 100,000 of population in 1908. The maximum rate was 10.8 in 1907. The minimum rate for the rural districts was 3.0 in 1904. The maximum rate was 5.1 in 1908. In 1909 the rural mortality from alcoholism was 68.1 per cent. of the urban.

Epidemic CEREBROSPINAL MENINGITIS is decidedly more common in the cities of New York State than in the rural districts. The minimum mortality rate in cities occurred in 1909, when it was 6.4 per 100,000 of population, and the maximum rate in 1905, when it was 41.1. The highest mortality from epidemic cerebrospinal meningitis in rural districts occurred in 1905, when the rate attained to 8.9 per 100,000 of population, the minimum rate occurring in 1909, when it was 3.6.

The mortality from GENERAL PARALYS higher in the rural districts than in citie that institutions for the insane are located of course, are largely drawn from the country. It would be unwise to form co rates, but the problem is one of such that a thorough investigation should b true incidence of insanity on the basis of redistributed according to the home loca may be stated, however, that in 1909 t paralysis of the insane was 4.8 per 1 New York State cities, against 12.2 for

The mortality from EPILEPSY is subj of caution on account of the fact that located in rural districts. In 1909 th was 2.6 per 100,000 of population fo against 6.4 for the rural territory.

The mortality from HEART DISEASE tricts than in the cities, partly on accou of aged persons in the rural population rate from heart disease in cities occu 103.8 per 100,000 of population, and t it was 144.2. The minimum rate in in 1900, when it was 135.9, and the ma it was 197.3. There is apparently a g tality rate from heart disease, due, of c in the average age of the population, b in the mortality rate at the younger ag

The mortality from ANGINA PECTO rural districts than in the cities of Ne apparently a slight tendency towards a of this cause in rural territory. Th from angina pectoris in the cities was in 1901, and the maximum rate was mortality rate in the rural territory maximum rate was 11.8 in 1908.

The mortality from ACUTE BRONCH the cities than in the rural districts, b a material reduction in the urban de

ing recent years. The reduction is probably more apparent than real and is due to improved or changed methods of disease classification, and perhaps medical diagnosis. In 1909 the mortality rate from acute bronchitis was 19.5 per 100,000 for New York State cities, against 12.3 for the rural territory. In 1900, however, the rates were respectively 40.7 and 14.0.

The mortality rate from CHRONIC BRONCHITIS has also undergone material changes during the decade under review. The rate for cities has been reduced from 24.7 per 100,000 of population in 1900 to 9.3 in 1908. The corresponding reduction in the rural death rate has been from 16.4 in 1901 to 10.3 in 1906. The decrease in the rates is probably more apparent than real, and due, in part at least, to improved methods of classification, and possibly to medical diagnosis.

The mortality from BRONCHIAL PNEUMONIA is decidedly excessive in cities in comparison with the corresponding death rate for rural districts. The minimum mortality rate for cities was 26.6 per 100,000 of population in 1900, and the maximum rate was 91.4 in 1909. The minimum rate for the rural territory was 14.5 in 1909, and the maximum rate was 33.2 in 1909. In part this increase is probably the result of the large Italian population which especially at the younger ages is subject to an excessive mortality from respiratory diseases.

PNEUMONIA, LOBAR AND UNQUALIFIED, is, throughout, in excess in the urban, as compared with the rural territory of New York State. The rates, however, have declined, but much more so in the cities. The minimum rate was 106.2 per 100,000 of population in 1908, and the maximum rate 232.8 in 1900, for the cities; while for the rural territory the minimum rate was 87.8 in 1908, and the maximum rate 110.9 in 1900. In 1909 the rural pneumonia death rate was 81.0 per cent. of the urban. Combining the rural death rates from Broncho Pneumonia and Pneumonia, lobar and unqualified, the rate has remained practically the same, or to be exact, it was 125.4 in 1900 as against 124.5 in 1909.

PLEURISY is also much more common in the cities than in the rural districts, and the rates have not undergone very material changes during the decade under review. The minimum pleurisy mortality rate for cities was 6.2 per 100,000 of population in 1908 and 1909, and the maximum rate was 7.7 in 1904. For the

rural territory, the minimum rate was
mum rate was 4.0 in 1909. The cha
material significance, but apparently
a diminishing excess in the urban rate

The mortality from GASTRITIS has
and the rural territory. The minimu
tritis in the cities was 4.4 in 1909,
12.6 in 1900, per 100,000 of populati
the rural territory was 8.6 in 1909,
14.7 in 1900.

The mortality from DIARRHEA AND
chiefly includes children under five y
cessive in the cities of New York Sta
territory. The minimum rate for the
lation was 122.8 in 1909, and the m
1900. The minimum mortality rate
51.3 and the maximum rate was
spectively, 1903 and 1909. The tenc
the mortality from diarrhea and enter
in the cities than in the rural district
cline in the urban and rural territor
importance.

The mortality from HERNIA is rel
but it may be stated as a matter of in
higher in cities than in rural districts,
tive rates were 5.0 per 100,000 of pop
3.8 for the rural territory.

The mortality from CIRRHOSIS OF
the cities of New York State than
rates have not been subject to a wide
per 100,000 of population in New Yo
in 1909, while the maximum rate wa
mum rate for the rural territory was
mum rate was 15.1 in 1907. In 19
cirrhosis of the liver was 69.9 per

APPENDICITIS is decidedly more
the rural districts, but in part this
use made of city hospitals for operati
tion. This, however, would not app

for the differences disclosed by the analysis of the returns. The minimum mortality rate from appendicitis in the cities was 11.5 per 100,000 of population in 1902, and the maximum rate was 14.0 in 1904. The minimum rate in the rural districts was 5.6 in 1907, and the maximum rate was 7.5 in 1904. There appears to be no very decided tendency towards a decline in the appendicitis mortality rate in either the urban or rural territory of New York State.

The mortality from ACUTE NEPHRITIS is decidedly excessive in New York State cities, and apparently the rate is on the increase in both the urban and the rural territories. The minimum mortality rate from acute nephritis in the cities was 11.8 per 100,000 of population in 1900, and the maximum was 16.9 in 1902. The minimum rate in the rural territory was 5.1 in 1900, and the maximum rate was 10.5 in 1908.

The returns for BRIGHT'S DISEASE are probably more conclusive. and in this case also the urban mortality is decidedly in excess of the rural. The minimum mortality rate from Bright's disease in the cities was 116.1 per 100,000 of population, in 1908, against a maximum of 137.2 in 1904. The minimum mortality in the rural districts was 68.9 in 1900, against a maximum of 95.6 in 1909. While the evidence is not quite conclusive, there appears to be a tendency towards an increase in the mortality from Bright's disease in both the urban and rural territories.

DISEASES OF THE BLADDER are apparently of much greater frequency in the rural territory than in cities, but the rate is not of material importance. The minimum mortality from diseases of the bladder in cities was 1.4 per 100,000 of population in 1909, and the maximum rate was 3.9 in 1901. The minimum rate in the rural territory was 5.6 in 1906, and the maximum rate was 9.1 in 1900. The decline in the rates may be more apparent than real, due to a more accurate and scientific disease classification.

The mortality from UTERINE TUMORS is higher in the cities than in the rural districts, but the rates are quite low and do not require extended analysis. In 1909 the mortality from uterine tumors in cities was 2.2 per 100,000 of population, and in the rural territory it was 1.7. It is quite possible that if these rates were corrected for age the differences would be much more pronounced.

The same conclusion applies to t
TUMORS, which is apparently much
York State than in the rural districts.
for the cities was 1.2 per 100,000 (
rural districts the rate was only 0.7.

The same conclusion also applies to
OF THE TUBES. The rates througho
cidedly higher in the cities than in tl
this may be the result of the use m
urban centers by the rural populations
from diseases of the tubes was 2.7 pe
the cities, against 0.5 for the rural di

The mortality from CHILDBIRTH is
York State than in the rural district
tendency towards an increase rather
rence of what is generally considered
ventable causes. The minimum mort
the cities was 15.1 per 100,000 of p
maximum rate was 19.4 in 1905.
districts was 9.0 in 1900, and the
1907. In 1909 the rural mortality ra
per cent. of the urban. It is quite
were corrected for age, and the co
population the differences would be eve

The mortality from DISEASES OF T
cities than in the rural districts. In 1
per 100,000 of population, and the ru

Deaths from the DISEASES OF EAR
much more numerous in the cities tha
partly to a larger proportion of childr
The minimum mortality rate for citie
population in 1901, and the maximum
the rural districts, the minimum rate
maximum rate was 51.1 in 1908. This
difficult one as regards exact classifica
premature births, congenital debility,
fancy, and lack of care. A more exact c
of this kind to other groups, but, subj

facts would seem to show a higher mortality from diseases of early infancy among the urban population.

The foregoing enumeration of some of the principal causes of death in the State of New York, brings out conclusively the marked contrast in the relative incidences of disease prevalence in the urban and rural districts. It requires no discussion to sustain the conclusion that, for a full understanding of the problems of rural mortality, a thorough analysis is necessary as regards the geographical distribution of disease. The census reports are limited to counties, but fortunately the reports of the State Department of Health give the information by principal causes for townships, so that with a comparatively small amount of labor it is not difficult to construct a fairly trustworthy map showing the local incidence of particular causes. Before I take up this phase of the rural mortality problem, it has seemed to me advisable to briefly discuss the relative frequency of a few of the more important causes of death by counties, and I have again relied exclusively for my information upon the data published by the census office, since the same are in conformity to a uniform standard applicable, for purposes of comparison, to other registration states.

A study of the rural death rate by counties affords much food for reflection and indicates the wide variations in local incidence more or less correlated to local conditions. The census death rates for particular causes, by counties, unfortunately, are not given in the form of an average for a period of years, and for the present purpose it has not been feasible to calculate such rates, which, however, would be more representative of average conditions than rates by single years. Appended to this discussion is a series of tables in which are given the rates for each year of the period 1900-1909, for the principal causes of death, and for the rural districts of each of the fifty-seven counties. The tables show in addition thereto the average rural death rate for the State of New York, the average rate for cities, and the average rate for the rural territory of the registration states. The amount of information brought together is so considerable that a discussion in detail is out of the question. The tables indicate with approximate accuracy the geographical distribution of the principal diseases throughout the rural districts of the State of New York, but allowance requires to be made for the effect of state institutions.

Limiting the present review, there shown that the average rural death rat State of New York was 15.3 per 1(14.7 for New York State cities and 2 the registration states. There were i in Hamilton, Putnam and Schenect course, the cities located therein). T mung county, where it attained to tion. The changes in the incidence considered by counties, are shown in five-year periods. In this table the as each year, is represented by a sin simply to show the change which ha mortality throughout the rural portic

RURAL MORTALITY RATE FROM TYPHOID FEVE YORK

(Rates per 100,000 of

RANGE IN MORTALITY RATE
No death..................................
Rate under 15..............................
Rate 15–29................................
Rate 30+..................................

The table shows conclusively that i provement in the typhoid fever situ portion of the State. During the fi the rate exceeded 30 per 100,000 of p of 285, which number is simply 57 c during the five years following there which the rate exceeded 30 per 100,0 occurrence of excessive typhoid fever in an increase of lower rates in a large whereas during the first five years the which the rate was below 15 per 100,(sponding number for the next five year would seem to warrant the conclusion t fever throughout rural New York improvement during the last five years

The mortality rate from MALARIA the case of Putnam county in 1906, w

100,000 of population. The rate was also high in the same county in 1908, when it was 20.8. There were no deaths from malaria the year following. In 1909 the rural malaria rate for the State of New York was 1.5 per 100,000 of population, against 0.9 for New York State cities, and 1.8 for the rural region of the registration states. Of course, the incidence of malarial fever as a disease may be quite high without necessarily being reflected in the mortality. During the five years ending with 1904 there were 133 out of 285 instances in which no deaths from malarial fever occurred in the rural regions of the State of New York, but during the five years following the conditions improved, and the number of instances in which there were no deaths from malarial fever increased to 170. The mortality from malarial fever exceeded 5 per 100,000 of population in 63 instances during the first five years of the decade, against 40 during the five years following. The details are given in the table below:

RURAL MORTALITY RATE FROM MALARIAL FEVER, COUNTIES OF THE STATE OF NEW YORK

(Rates per 100,000 of population)

RANGE IN MORTALITY RATE	1900–04 No. of counties	1905–09 No. of counties
No death	133	170
Rate 1–4	89	75
Rate 5+	63	40
	285	285

The foregoing comparison, therefore, would seem to warrant the conclusion that the incidence of fatal malarial fever has considerably diminished throughout rural New York during the last half of the decade under review.

The mortality from SCARLET FEVER has been subject to wide fluctuation and the number of instances in which the disease did not prevail at all in a fatal form increased only slightly during the last five years of the decade in comparison with the first. The number of such instances was 81 during the five years ending with 1904, against 99 during the five years ending with 1909. The number of instances when the rate exceeded 10 per 100,000 of population diminished from 49 during the first half of the period to 36 during the last. While the improvement has not been considerable, the change at least is evidence that the tendency is

towards a diminution in the occurrence of exceptional severity.

RURAL MORTALITY RATE FROM SCARLET FEVER, (YORK

(Rates per 100,000 of po)

RANGE IN MORTALITY RATE
No death......................................
Rate 1–9......................................
Rate 10+......................................

In 1909 the average scarlet fever State was 5.0 per 100,000 of populatio The rate attained a maximum of 63.4 in Schenectady county in 1902. The the disease has varied considerably, bu most exempt therefrom is Hamilton, reported since 1900, and Tompkins the disease, (with low rates) have b and 1909.

The mortality from DIPHTHERIA AN ject to wide variations and naturall demic character of this disease and th occurrence and recurrence. In 190 croup rate for the State of New Yo population against 31.3 for New York ing the year was highest in Chautauq to 35.5, but much higher rates have p stances. The rate attained to a max of population in the case of Schenect the first five years of the decade und instances in which the disease did n five years the number of such instanc the first five years there were 50 insta mortality rate exceeded 30 per 100,00 19 instances during the last five years clusive that the seriousness of diphth has been materially diminished durin

throughout rural New York. The details of comparative incidence are given in the table below:

RURAL MORTALITY RATE FROM DIPHTHERIA AND CROUP, COUNTIES OF THE STATE OF NEW YORK

(Rates per 100,000 of population)

RANGE IN MORTALITY RATE	1900–04 No. of counties	1905–09 No. of counties
No death	16	26
Rate 1-14	123	166
Rate 15-29	96	74
Rate 30+	50	19
	285	285

The mortality from INFLUENZA has been subject to a wide range of variations, from no deaths in the case of a few counties, to a rate of as high as 118.4 per 100,000 of population in the case of Cayuga county in 1901. The rates have been high throughout the several counties of the State during most of the years of the decade ending with 1909. The rural rate in 1909 was 21.3 per 100,000 of population, against 6.7 for the cities of New York State. The maximum rate in 1909 prevailed in Broome county, where it reached 52.7 per 100,000 of population. During the first five years of the period there were 42 instances without deaths from influenza but this number had increased to 57 during the last half of the decade under review. During the first five years there were 75 instances when the influenza mortality was 45 or over per 100,000 of population, against only 57 during the last five years. There appears, therefore, to have been an improvement, which, however, is neither very marked, or apparently very generally distributed throughout the State.

RURAL MORTALITY RATE FROM INFLUENZA, COUNTIES OF THE STATE OF NEW YORK

(Rates per 100,000 of population)

RANGE IN MORTALITY RATE	1900–04 No. of counties	1905–09 No. of counties
Under 15	42	57
Rate 15–29	102	104
Rate 30–44	66	67
Rate 45+	75	57
	285	285

The mortality from TUBERCULOSIS OF THE LUNGS has been most varied throughout the 57 counties and the ten-year period under review. There is no instance in which there have not been deaths from this disease in any one of the counties, but the number of

conclusive researches of Dr. Chas. E. Greene, of Edinburgh. The principal publications by Dr. Greene are Cancer, a Statistical Study; The Local Incidence of Cancer, Edinburgh, 1912; A Study of the Local Incidence of Cancer in Nairnshire, Edinburgh Medical Journal, October, 1912. As another illustration of modern research, see report on the Problem of the Gasworks, Pitch Industries and Cancer, published by John Murray, London, 1913.

RURAL MORTALITY RATE FROM CANCER, COUNTIES OF THE STATE OF NEW YORK

(Rates per 100,000 of population)

RANGE IN MORTALITY RATE	1900–04 No. of counties	1905–09 No. of counties
Under 80	185	142
Rate 80+	100	143
	285	285

The mortality from DIABETES is apparently on the increase, and the death rate for rural New York State has changed from 11.5 in 1900 to 16.7 in 1909, per 100,000 of population. In three counties during 1909 no death from diabetes occurred, but the rate reached a maximum of 46.5 per 100,000 of population in the case of Otsego county. The rate, therefore, is subject to quite a range of variation. The incidence of rates has changed from 41 instances with rates of 20 and over during the first five years of the decade under review, to 74 during the last.

Whether this is the result of improved methods of diagnosis, or because of an increase in the Jewish population, which is apparently very susceptible to the disease, there would appear to be a decided tendency towards an increase, which is fairly traceable even throughout rural New York, although in a large portion of the State the explanation as regards the Jewish population does not apply.

RURAL MORTALITY RATE FROM DIABETES, COUNTIES OF THE STATE OF NEW YORK

(Rates per 100,000 of population)

RANGE IN MORTALITY RATE	1900–04 No. of counties	1905–09 No. of counties
No death	13	11
Rate 1–9	87	61
Rate 10–19	144	139
Rate 20+	41	74
	285	285

although the patients may have been lifelong residents of rural districts. The cancer death rate throughout rural New York State, however, is higher than the city rate, which is partly due, of course, to a larger proportion of persons aged 45 and over. During 1909 the average cancer rate for the rural districts was 86.9 per 100,000 of population, against 79.0 for the cities. The rate is much higher than for the rural portion of the registration area generally, which, in 1909, was returned as 67.2. No thorough study of the geographical incidence of cancer in the State of New York appears to have been made, but the subject is certainly one deserving of special consideration. In such a study, of course, the deaths in institutions should be redistributed in the manner as this has been done by Dr. Chas. E. Greene, of Edinburgh, in his well known studies on the local incidence of cancer throughout Scotland. The cancer rates are subject to wide variation, the majority ranging from about 20 to 129 per 100,000 of population. During the first five years of the decade under review the mortality from cancer was over 80 per 100,000 of population in 100 instances, increasing to 143 during the five years following. There appears to be conclusive evidence that the mortality from cancer is on the increase, but how far this change for the worse is more apparent than real, on account of an increasing proportion of persons aged 45 and over, cannot be shown without a qualified analysis of the facts. In this connection it may be observed that the actual liability to cancer may be increasing without being necessarily reflected in the death rates. This, of course, is due to the improved methods of early diagnosis, and the successful results of operative treatment in the early stages of the disease. There might, therefore, be a stationary condition in the death rate from cancer without there being a lesser liability to the disease. From all the facts available, it would seem to conclude that the liability to cancer is increasing. Cancer, of course, is a general term, and for a full understanding, the organs affected require to be considered and in proper relation to the age and sex distribution of the population, its conjugal condition, and possibly the occupations. Even more important, however, would seem to be the study of the possible relation of topography to cancer occurrence, on the basis of the extremely interesting and apparently

conclusive researches of Dr. Chas. E. Gre
principal publications by Dr. Greene a
Study; The Local Incidence of Cancer
Study of the Local Incidence of Cancer in
Medical Journal, October, 1912. As
modern research, see report on the Pr
Pitch Industries and Cancer, published b
1913.

RURAL MORTALITY RATE FROM CANCER, COUNTIES
(Rates per 100,000 of popu

RANGE IN MORTALITY RATE	
Under 80	
Rate 80+	

The mortality from DIABETES is appa
the death rate for rural New York Sta
in 1900 to 16.7 in 1909, per 100,000 of
ties during 1909 no death from diabe
reached a maximum of 46.5 per 100,00
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of variation. The incidence of rates
stances with rates of 20 and over durin
decade under review, to 74 during the

Whether this is the result of impro
or because of an increase in the Je
apparently very susceptible to the dise
be a decided tendency towards an incr
able even throughout rural New York.
of the State the explanation as regards
not apply.

RURAL MORTALITY RATE FROM DIABETES, COUN
(Rates per 100,000 of po

RANGE IN MORTALITY RATE	
No death	
Rate 1-9	
Rate 10-19	
Rate 20+	

The mortality from PNEUMONIA, lobar and unqualified is also subject to a very wide range of frequency distribution, from 33.3 to 226 per 100,000 of population. The maximum rate of 226 occurred in Cortland county in 1901. The average pneumonia rate is lower in the rural territory than in the cities although the proportion of aged population is greater. During 1909 the maximum rate was attained in Madison county, where it reached 134.8 per 100,000 of population, against an average of 91.3 for rural New York.

A comparison of the distribution of rates during the first five years with the last does not indicate very material changes in the occurrence of fatal forms of pneumonia. The rate was 100 or over per 100,000 of population in 123 instances during the first five years, against 109 during the last. The differences are not sufficiently marked to warrant the conclusion that there is a distinct tendency towards a decrease in the occurrence of deaths from pneumonia, but in any event there is no evidence that the rate is on the increase.

RURAL MORTALITY RATE FROM PNEUMONIA, LOBAR AND UNQUALIFIED, COUNTIES OF THE STATE OF NEW YORK

(Rates per 100,000 of population)

RANGE IN MORTALITY RATE	1900–04 No. of counties	1905–09 No. of counties
Under 80	75	94
Rate 80–99	87	82
Rate 100+	123	109
	285	285

The mortality from BRIGHT'S DISEASE and NEPHRITIS is also subject to wide variations. The maximum rate of 219.8 per 100,000 of population occurred in Fulton county, in 1907. The mortality is lower in the rural districts of the State of New York as compared with the cities, the rates during 1909 being respectively, 104.9 and 135.9 per 100,000 of population. The maximum mortality rate in 1909 also occurred in Fulton county, being 200.00 per 100,000 of population. The frequency distribution changed from 35 instances, when the rate was 120 or over, during the first five years, to 73 during the last. A careful study of the facts would seem to warrant the conclusion that the mortality from Bright's disease and Nephritis is unquestionably on the increase throughout rural New York. How far this increase is partly the

MORTALITY FROM ALL CAUSES, REGISTRATION STATES, U. S. CENSUS OF 1900
(Rates per 100,000 of population)

AGES	Cities	Rural districts
Under 5	59.7	34.4
5–14	4.3	3.2
15–24	5.9	5.2
25–34	9.1	6.8
35–44	12.1	8.0
45–64	24.3	15.7
65+	90.9	76.8

According to this table the excess in the city mortality is most pronounced at ages under 5, and at ages 25-64, inclusive. Although the foregoing table refers to the registration states at large, it is safe to assume that similar differences in favor of country life would be brought out by a careful analysis of the statistics for the State of New York.

As a further illustration, I add a table giving in detail the mortality from tuberculosis of the lungs, also derived from the vital statistics of the census of 1900:

MORTALITY FROM TUBERCULOSIS OF THE LUNGS, REGISTRATION STATES, U. S. CENSUS OF 1900
(Rates per 100,000 of population)

AGES	Cities	Rural districts
Under 15	43.2	25.5
15–44	276.8	179.1
45–64	257.9	151.4
65+	264.2	233.6

These illustrations are sufficient to emphasize the practical utility of a qualified analysis of the vital statistics of the rural population of the State of New York. Inquiries of this kind are measurably more useful than broad generalizations, which may be pleasing to those who make them but which do not aid in the furtherance of the important cause of public hygiene. There is entirely too much mere statistical analysis without a precise recognition of the end in view, and as a result the cause of public health as conditioned by trustworthy vital statistics is hindered to a considerable extent. For, if the facts with regard to the true local incidence of any particular disease were thoroughly well known and understood, it would be only a question of time when a measurable improvement would be brought about. The value of the statistical method of inquiry has as yet been but very imperfectly realized. As a pertinent illustration, however, of the future possibilities of this field of inquiry, I may refer to the three reports

is only by this method that the true incidence of the disease can be studied to practical purpose. In this case, however, it is of particular importance that corrections be made for treatment in institutions, and that the deaths of those who die from cancer in the hospitals of large cities be redistributed according to the home residences of the deceased patients.

It was originally my intention to discuss in some detail the comparative mortality of the agricultural population. It is practically certain that there are important differences in the death rates of farmers, farm laborers, horticulturists, gardeners, woodsmen, etc. The census reports give some consideration to this question and the published data are of considerable value. The available information is for the registration area as a whole and no such information in detail is at present obtainable for the agricultural industries of the State of New York. Obviously, with an extension of the registration area to the rural portions of new states, particularly in the South, new agricultural employments will be brought within the scope of the Division of Vital Statistics which are now outside thereof. A southern planter, or a negro plantation laborer, is certainly at work under quite different conditions affecting health than a farmer or agricultural laborer in the State of New York or on the western plains. The same conclusion applies to the sanitary conditions affecting farm life. No extended investigation is necessary to prove that the rice planter of southwestern Louisiana is subject to fundamentally different conditions affecting health than the cotton planter of Alabama or the truck farmer of the region adjacent to the city of Norfolk. I refer to these differences in conditions merely to emphasize the complex nature of the problem of rural hygiene and the need of guarding against possible errors in the use of returns derived from the country as a whole.

It also has not been feasible to discuss in detail the comparative mortality of the urban and rural populations according to age and sex. The latest available information on this subject for the registration states is for 1900, but it is practically certain that, in a general way, the observed differences in the death rates have remained about the same. I include a table derived from the census of 1900 which precisely illustrates the point at present under consideration.

MORTALITY FROM ALL CAUSES, REGISTRATION
(Rates per 100,000 of po

AGES
Under 5
5–14
15–24
25–34
35–44
45–64
65+

According to this table the excess in pronounced at ages under 5, and at though the foregoing table refers to the it is safe to assume that similar diffe life would be brought out by a caref for the State of New York.

As a further illustration, I add a ta tality from tuberculosis of the lungs, statistics of the census of 1900:

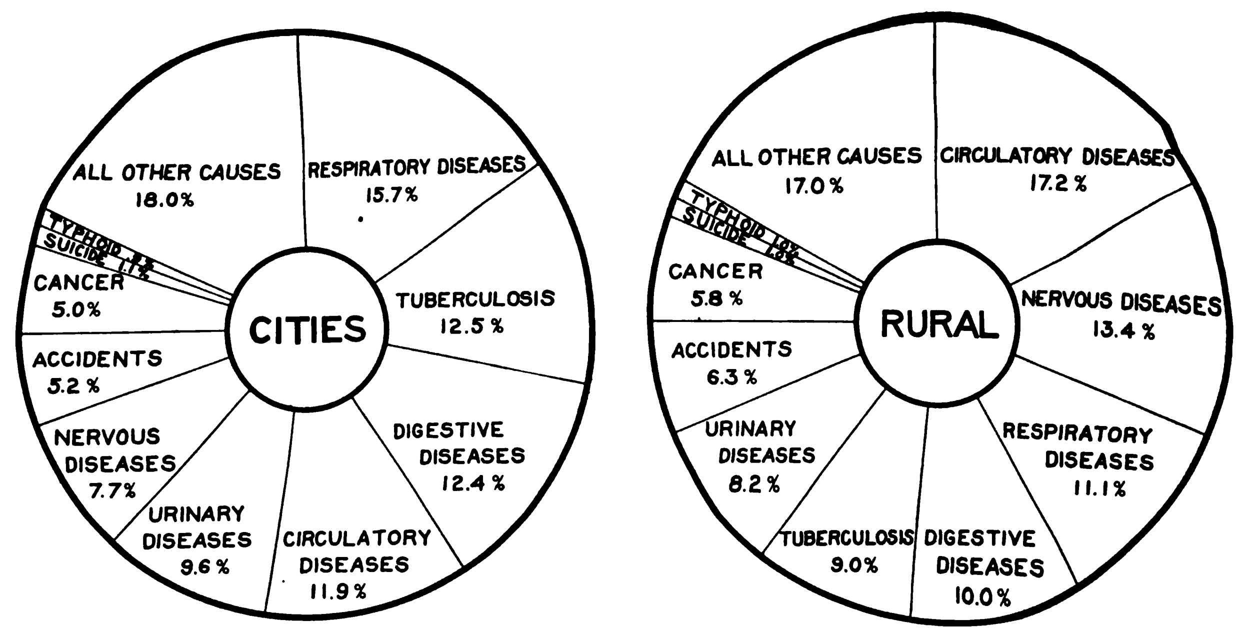
MORTALITY FROM TUBERCULOSIS OF THE LUNGS,
OF 1900

(Rates per 100,000 of p

AGES
Under 15
15–44
45–64
65+

These illustrations are sufficient to ity of a qualified analysis of the vita lation of the State of New York. In urably more useful than broad ge pleasing to those who make them bu therance of the important cause of tirely too much mere statistical ana nition of the end in view, and as a re as conditioned by trustworthy vital s siderable extent. For, if the facts incidence of any particular disease and understood, it would be only a urable improvement would be brou statistical method of inquiry has as realized. As a pertinent illustratio sibilities of this field of inquiry, I

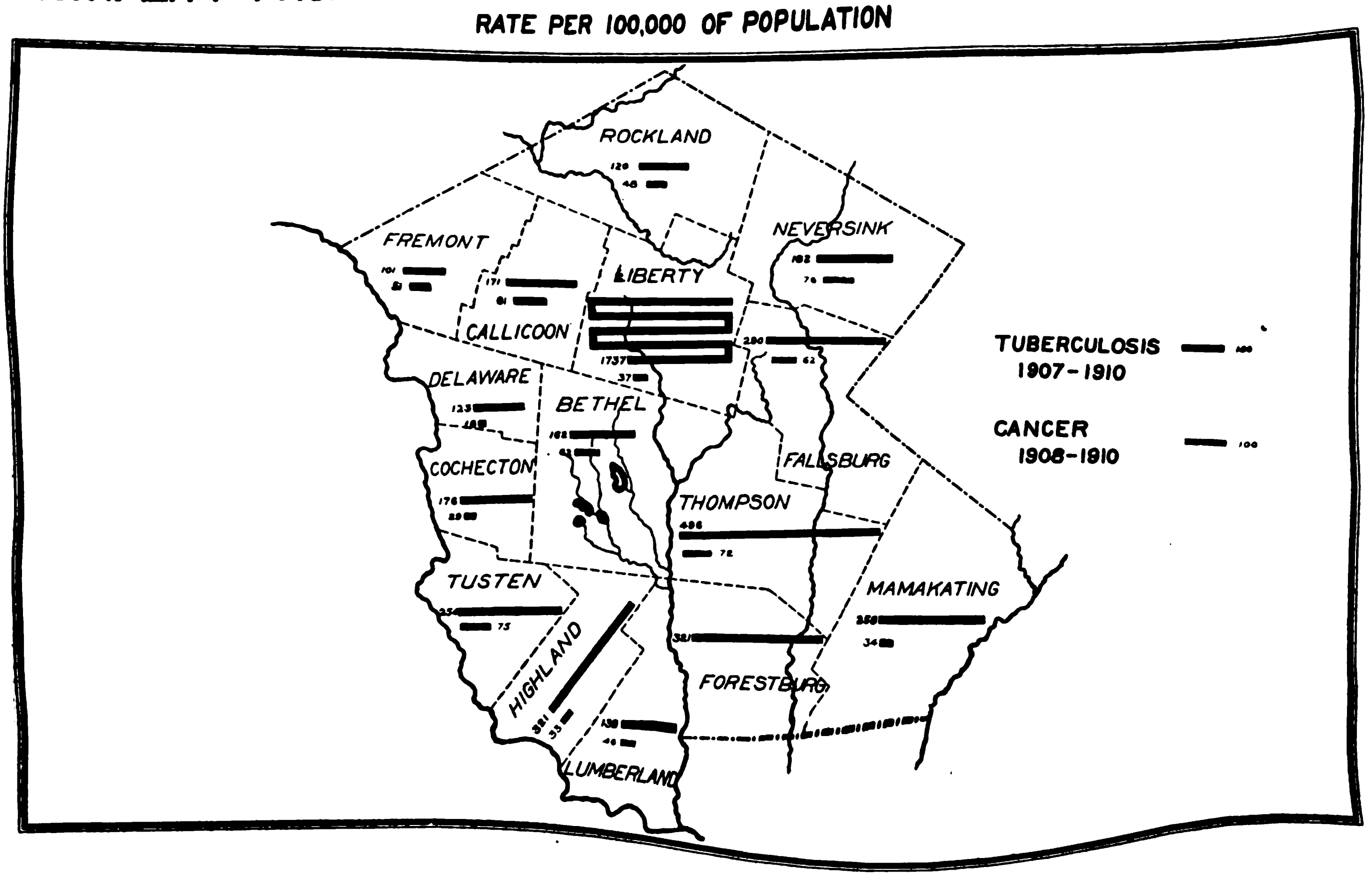
URBAN AND RURAL MORTALITY OF NEW YORK STATE
1909



PERCENTAGE DISTRIBUTION OF DEATHS FROM PRINCIPAL CAUSES

MORTALITY FROM TUBERCULOSIS AND CANCER IN SULLIVAN COUNTY, N.Y.

RATE PER 100,000 OF POPULATION



on the statistical investigation of plague in the Punjab, by Greenwood, of the Leicester Institute, and published in the *Journal of Hygiene*. Such inquiries are laborious, and they require a very high order of intelligence and the same unselfish devotion as long-continued research in other branches of science.

1. A complete sanitary survey of the State should be made under the direction of the State Department of Health, for the purpose of showing precisely the relation of health and mortality to local topography, surface geology, water supplies, soils, forests, etc.

2. There should be a complete analysis of the geographical distribution of disease throughout the State of New York in much the same manner as this was done by the late S. W. Abbott, secretary of the State Board of Health of Massachusetts in the report of that State for 1891.

3. A special study should be made of the sanitary relations of railways and canals, past and present, to the health of the rural population, but with special reference to the relative incidence of typhoid fever and other infectious diseases.

4. A special study should be made of the mortality of farmers, farmers' wives, and agricultural laborers, woodsmen and others employed throughout the rural districts of the State of New York. Such an analysis should be according to age and principal causes, and should extend over a period of at least five years. It should include every important division of farm work and special consideration should be given to diseases common to both men and animals.

5. A special study should be made of the occurrence of occupational accidents in agriculture, the causes of their occurrence, and the best means for their prevention.

6. A qualified study should be made of present sanitary conditions of farm life, sanitary conveniences of farm houses, including housing conditions in small villages and rural industrial settlements.

7. The subject of rural isolation hospitals and dispensaries should receive special consideration, particularly with regard to the problem of first aid to the injured in rural districts, accidents in agriculture, and diseases contracted from farm animals.

8. An original and thoroughly impartial investigation should

COMPARATIVE RURAL MORTALITY RATES FROM TYPHOID FEVER — (*Continued*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Schuyler	19.0	12.8	19.4	19.6	19.8	20.0	20.3	34.3	20.9	21.2
Seneca	21.3	10.7	21.5	18.0	10.9	25.5	18.3	29.4	11.0	14.8
Steuben	23.7	16.8	22.6	18.5	24.3	17.3	39.1	10.7	12.5	10.7
Suffolk	23.2	21.3	17.1	11.9	18.6	20.5	8.9	10.9	7.5	11.6
Sullivan	37.1	24.4	33.1	17.8	8.8	40.4	23.2	29.2	23.4	23.6
Tioga	43.0	32.5	21.8	25.7	14.8	29.9	18.9	41.9	19.2	11.6
Tompkins	29.0	29.3	24.7	30.1	30.4	30.8	25.9	5.2	15.7	21.1
Ulster	39.1	26.8	44.6	24.1	40.5	14.7	27.3	15.8	14.0	7.7
Warren	34.6	17.3	46.3	23.2	11.6	40.8	29.2	29.3	46.9	23.5
Washington	30.7	26.1	23.8	10.7	21.3	59.3	44.4	27.4	18.9	18.9
Wayne	10.3	26.7	39.0	14.3	28.6	28.6	16.3	22.2	14.1	16.0
Westchester	17.8	19.2	11.3	12.8	23.7	19.2	17.6	19.6	11.5	8.8
Wyoming	26.3	13.1	32.5	19.4	6.4	9.6	19.1	9.5	31.6	9.4
Yates	49.2	24.9	20.1	20.3	35.9	10.4	10.4	10.5	10.6	37.3
N. Y. State, cities	25.4	23.8	23.2	22.3	21.3	19.1	18.7	20.3	15.8	14.7
N. Y. State, rural	32.0	27.2	23.2	21.8	21.3	21.8	20.3	19.3	16.9	15.3
Reg. States, rural	34.6	28.8	26.9	24.6	23.7	23.1	27.8	25.1	23.2	20.9

COMPARATIVE RURAL MORTALITY RATES FROM MALARIAL FEVER IN NEW YORK STATE BY COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Albany	....	....	....	....	....	....	5.9	....	....	....
Allegany	2.4	2.4	4.7	2.4	2.3	....	....	4.7	....	2.4
Broome	3.4	3.4	3.4	3.3	3.3	....	....	3.3	....	3.3
Cattaraugus	1.8	....	1.8	....	....	1.8	1.8	....	....	1.9
Cayuga	2.8	2.8	5.7	2.9	2.9	....	3.0	....	....	....
Chautauqua	1.9	9.2	1.8	1.8	1.8	....	5.4	5.4	1.8	1.8
Chemung	....	5.5	....	....	11.7	5.9	....	....	....	....
Chenango	5.5	....	2.7	2.7	....	2.7	2.7	....	2.8	....
Clinton	4.2	....	....	....	2.1	....	2.6	2.6	2.7	....
Columbia	....	....	9.0	3.0	3.1	....	6.2	....	....	....
Cortland	....	5.4	....	....	....	....	....	5.6	....	....
Delaware	....	....	....	....	....	2.1	....	....	....	....
Dutchess	12.1	12.1	10.3	5.1	5.1	3.4	8.5	3.4	6.7	1.7
Erie	3.7	2.4	....	....	1.1	....	2.0	....	....	....
Essex	....	....	....	3.1	....	3.1	....	3.0	....	....
Franklin	....	2.3	4.5	4.4	....	4.3	....	....	....	....
Fulton	....	....	....	....	....	....	....	....	....	7.4
Genesee	....	5.7	2.9	....	2.8	2.8	....	....	....	....
Greene	....	....	3.2	3.2	....	3.2	3.2	6.5	6.6	6.6
Hamilton	....	....	....	....	....	....	....	....	....	....
Herkimer	1.9	3.9	....	....	1.8	1.9	....	....	2.3	....
Jefferson	7.2	1.8	1.8	1.8	....	3.6	5.5	3.7	1.8	5.6
Lewis	7.3	3.7	3.7	7.4	....	....	....	....	....	....
Livingston	2.7	8.1	2.7	....	5.4	....	2.7	5.3	....	....
Madison	....	....	....	2.5	....	....	....	2.5	....	....

an immeasurable advantage in health-giving conditions over at least the more densely populated sections of urban centers, it would also seem to admit of no controversy that a further reduction of the rural death rate is a feasible problem, and that if this is admitted, the inauguration of a well-defined program of rural sanitation is the unquestionable duty of the State.

COMPARATIVE RURAL MORTALITY RATES FROM TYPHOID FEVER IN NEW YORK STATE BY COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Albany	39.2	74.8	29.7	14.8	35.2	32.1	35.2	23.5	23.6	5.9
Allegany	33.7	31.1	21.4	23.6	9.4	23.2	28.1	9.4	23.8	31.2
Broome	23.7	33.7	13.4	10.0	6.6	23.2	33.1	13.2	13.2	16.5
Cattaraugus	40.9	19.6	19.6	17.9	21.5	7.2	21.6	12.7	25.5	21.4
Cayuga	27.9	19.7	11.4	20.2	32.1	14.8	32.8	33.1	9.1	9.2
Chautauqua	31.6	24.0	22.1	21.9	20.0	9.0	19.8	16.1	12.5	14.2
Chemung	43.5	44.2	56.2	40.1	17.5	29.7	47.1	23.4	17.4	46.0
Chenango	24.6	27.3	27.3	10.9	16.3	16.3	11.0	11.0	13.9	22.4
Clinton	29.5	14.7	8.4	12.5	10.4	18.6	21.0	7.9	10.7	2.7
Columbia	56.4	62.8	18.1	21.2	21.4	24.6	24.7	18.5	21.7	18.6
Cortland	48.5	86.1	16.1	22.1	22.0	11.0	27.7	16.7	27.9	16.8
Delaware	43.1	25.8	6.5	12.9	23.6	15.0	17.3	23.8	19.6	8.7
Dutchess	27.8	29.4	25.8	30.8	20.5	17.0	8.5	15.2	13.5	10.1
Erie	29.5	17.8	18.3	26.5	12.8	13.4	25.3	17.9	22.5	15.4
Essex	35.8	25.8	28.7	25.2	9.3	18.5	15.3	36.5	12.1	18.0
Franklin	23.3	9.2	20.2	33.1	13.0	21.3	10.7	17.2	28.2	26.1
Fulton	.....	21.1	28.3	7.1	.....	7.2	14.6	7.3	14.7	14.8
Genesee	31.8	31.6	28.5	42.4	22.5	19.5	23.3	11.6	11.6	3.9
Greene	38.1	54.2	47.9	44.9	48.2	35.5	29.2	32.6	9.8	26.4
Hamilton	20.2	40.5	.....	.....	20.3	20.4	.....	42.7	.....	.....
Herkimer	54.9	15.5	13.4	15.2	15.1	3.7	14.0	9.3	11.5	11.4
Jefferson	32.7	25.4	23.6	18.2	21.9	20.1	29.3	27.6	11.5	20.4
Lewis	32.8	18.3	14.8	26.0	15.0	22.6	3.8	3.9	15.7	27.9
Livingston	35.1	13.5	5.4	8.1	18.8	21.4	10.7	10.6	13.2	7.9
Madison	22.2	34.7	24.9	12.5	22.7	7.6	22.8	10.2	22.9	2.5
Monroe	12.7	19.7	14.1	10.5	20.7	8.7	8.4	9.9	8.0	9.4
Montgomery	22.6	31.3	15.6	42.7	27.1	23.2	23.1	23.0	11.5	3.8
Nassau	14.4	13.7	19.7	7.8	15.0	26.0	9.6	18.5	15.3	14.7
Niagara	20.5	35.7	37.9	35.1	37.3	34.5	45.6	22.6	33.0	19.1
Oneida	49.1	18.1	19.9	20.0	28.4	18.5	13.5	18.5	27.0	18.6
Onondaga	21.5	31.4	26.4	26.3	26.3	21.3	11.4	20.9	12.8	19.2
Ontario	38.3	20.3	22.7	25.1	15.0	17.4	24.9	15.0	20.0	12.5
Orange	32.7	21.6	17.9	21.3	21.1	26.2	20.5	23.4	13.1	20.9
Orleans	26.5	32.9	45.7	29.1	3.2	6.4	25.4	19.0	25.2	6.3
Oswego	33.9	26.9	27.0	37.0	30.0	40.1	12.6	14.6	22.9	14.5
Otsego	26.6	24.6	30.9	20.7	26.7	14.6	18.8	39.9	23.2	27.5
Putnam	21.8	21.7	7.2	.....	.....	7.1	.....	7.0	13.8	.....
Rensselaer	68.1	62.5	39.0	26.1	35.0	35.1	33.0	46.2	26.4	28.6
Rockland	10.5	15.1	17.1	11.8	22.9	17.8	4.4	8.7	10.8	8.6
St. Lawrence	61.5	34.7	31.9	40.9	26.3	33.9	25.1	25.3	17.5	16.3
Saratoga	26.7	43.0	20.4	34.6	20.3	48.7	12.2	20.3	22.3	18.3
Schenectady	32.9	49.0	21.1	47.1	8.5	31.0	7.4	14.3	13.8	.....
Schoharie	63.3	56.6	15.3	34.8	23.5	19.8	28.1	40.6	12.3	20.8

COMPARATIVE RURAL MORTALITY RATES

Counties	1900	1901	1902	19
Schuyler	19.0	12.8	19.4	19
Seneca	21.3	10.7	21.5	18
Steuben	23.7	16.8	22.6	18.
Suffolk	23.2	21.3	17.1	11.
Sullivan	37.1	24.4	33.1	17.
Tioga	43.0	32.5	21.8	25.
Tompkins	29.0	29.3	24.7	30.
Ulster	39.1	26.8	44.6	24.
Warren	34.6	17.3	46.3	23
Washington	30.7	26.1	23.8	10.
Wayne	10.3	26.7	39.0	14.
Westchester	17.8	19.2	11.3	12.
Wyoming	26.3	13.1	32.5	19.
Yates	49.2	24.9	20.1	20.
N. Y. State, cities	25.4	23.8	23.2	22.
N. Y. State, rural	32.0	27.2	23.2	21.
Reg. States, rural	34.6	28.8	26.9	24.

COMPARATIVE RURAL MORTALITY RATES FROM
STATE BY COUNTIES,

Rates per 100,000 of

Counties	1900	1901	1902	1903
Albany	.....	.....	.....	.....
Allegany	2.4	2.4	4.7	2.4
Broome	3.4	3.4	3.4	3.3
Cattaraugus	1.8	.....	1.8	.....
Cayuga	2.8	2.8	5.7	2.9
Chautauqua	1.9	9.2	1.8	1.8
Chemung	.....	5.5	.....	.....
Chenango	5.5	.....	2.7	2.7
Clinton	4.2	.....	.....	.....
Columbia	.....	.....	9.0	3.0
Cortland	.....	5.4	.....	.....
Delaware	.....	.....	.....	.....
Dutchess	12.1	12.1	10.3	5.1
Erie	3.7	2.4	.....	.....
Essex	.....	.....	.....	3.1
Franklin	.....	2.3	4.5	4.4
Fulton	.....	.....	.....	.....
Genesee	.....	5.7	2.9	.....
Greene	.....	.....	3.2	3.2
Hamilton	.....	.....	.....	.....
Herkimer	1.9	3.9	.....	.....
Jefferson	7.2	1.8	1.8	1.8
Lewis	7.3	3.7	3.7	7.4
Livingston	2.7	8.1	2.7	.....
Madison	.....	.....	.....	2.5

COMPARATIVE RURAL MORTALITY RATES FROM MALARIAL FEVER —(*Continued*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Monroe	....	....	....	....	....	....	....	....	1.6	....
Montgomery	....	....	3.9	3.9	....	....	....	....	3.8	3.8
Nassau	12.6	3.4	6.6	14.1	6.0	7.2	2.8	4.0	5.1	6.1
Niagara	....	....	7.6	2.5	5.0	2.5	....	....	....	....
Oneida	1.6	1.6	....	....	1.7	3.4	....	....	1.7	....
Onondaga	1.6	1.7	1.6	....	1.6	3.3	....	1.6	....	....
Ontario	....	5.1	....	....	2.5	....	....	....	....	2.5
Orange	7.3	9.0	10.7	1.8	3.5	8.7	5.1	1.7	1.6	4.8
Orleans	6.6	....	....	6.5	3.2	3.2	....	....	....	....
Oswego	4.2	1.4	7.1	1.4	....	1.4	....	2.1	....	....
Otsego	....	2.1	2.1	....	....	2.1	2.1	....	....	....
Putnam	14.5	7.2	7.2	....	....	7.1	35.1	7.0	20.8	....
Rensselaer	2.1	....	....	2.2	2.2	....	4.4	2.2	....	....
Rockland	7.8	10.1	9.8	4.7	6.9	8.9	17.6	15.3	13.0	12.9
St. Lawrence	1.3	1.3	....	....	....	....	4.0	....	....	....
Saratoga	....	2.0	2.0	....	....	2.0	....	....	2.0	2.0
Schenectady	....	....	....	....	....	....	7.4	....	....	....
Schoharie	....	....	....	....	....	....	....	....	....	4.2
Schuyler	6.3	....	....	....	....	....	6.8	....	....	....
Seneca	7.1	....	3.6	....	....	....	7.3	....	3.7	3.7
Steuben	2.8	1.4	....	....	1.4	....	1.8	....	....	1.8
Suffolk	6.4	1.3	8.6	7.2	3.5	5.7	3.3	4.4	1.1	....
Sullivan	9.3	....	6.0	5.9	2.9	5.8	....	....	....	....
Tioga	....	3.6	....	7.3	....	....	....	....	....	....
Tompkins	....	....	....	5.0	....	....	....	....	....	....
Ulster	7.8	14.2	8.0	8.0	8.1	3.3	3.2	4.7	6.2	3.1
Warren	....	....	5.8	....	....	....	....	5.9	....	....
Washington	8.8	....	....	....	2.1	....	....	....	....	....
Wayne	2.1	2.1	....	6.1	....	4.1	....	....	....	2.0
Westchester	14.4	11.7	9.2	5.9	5.7	8.2	6.2	9.4	4.9	1.6
Wyoming	6.6	....	3.3	....	3.2	....	....	....	....	....
Yates	....	5.0	....	....	....	....	....	....	....	5.3
New York State, cities	4.9	4.1	3.0	1.9	2.4	1.4	2.0	1.5	0.7	0.9
New York State, rural	3.8	3.1	3.2	2.5	2.1	2.4	2.7	2.2	1.7	1.5
Reg. States, rural	7.2	5.0	4.4	3.7	3.3	3.5	2.6	2.0	1.6	1.8

COMPARATIVE RURAL MORTALITY RATES FROM SCARLET FEVER IN NEW YORK STATE BY COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Albany	15.1	3.0	11.9	17.7	....	11.7	2.9	20.6	3.0	....
Allegany	2.4	4.8	9.5	....	2.3	2.3	2.3	....	2.4	4.8
Broome	6.8	10.1	3.4	....	3.3	6.6	3.3	13.2	13.2	6.6
Cattaraugus	1.8	3.6	7.1	5.4	....	....	....	....	5.5	5.8
Cayuga	11.1	....	2.9	....	2.9	5.9	....	3.0	....	3.1
Chautauqua	3.7	5.5	7.4	7.3	12.7	1.8	3.6	7.2	1.8	....
Chemung	5.4	5.5	....	5.7	....	....	5.9	....	....	....
Chenango	2.7	21.9	2.7	2.7	5.4	10.9	....	27.6	2.8	11.2

COMPARATIVE RURAL MORTALITY RATES F

Counties	1900	1901	1902	1903	
Clinton	2.1	21.0	6.3	29.1	
Columbia	5.9	....	....	9.1	
Cortland	5.4	....	....	....	
Delaware	15.1	4.3	2.2	4.3	
Dutchess	8.7	8.6	1.7	5.1	
Erie	9.8	3.6	5.7	3.3	
Essex	6.5	6.4	3.2	6.3	
Franklin	2.3	2.3	27.0	8.8	
Fulton	....	....	7.1	14.3	
Genesee	....	8.6	....	....	
Greene	....	15.9	3.2	....	
Hamilton	40.4	....	....	....	
Herkimer	3.9	13.6	7.7	1.9	
Jefferson	....	3.6	1.8	....	
Lewis	3.6	....	11.1	....	
Livingston	....	....	5.4	....	
Madison	4.9	2.5	2.5	5.0	
Monroe	14.5	....	1.8	3.5	1
Montgomery	7.5	....	15.6	31.1	
Nassau	1.8	12.0	8.2	7.8	
Niagara	2.6	7.6	5.1	12.5	
Oneida	1.6	3.3	3.3	5.0	1
Onondaga	5.0	8.3	....	3.3	1
Ontario	15.3	....	2.5	2.5	[illegible]
Orange	3.6	5.4	8.9	3.5	5
Orleans	13.3	....	....	9.7	9
Oswego	....	....	....	4.3	2
Otsego	....	12.3	6.2	10.3	..
Putnam	....	....	....	....	21
Rensselaer	2.1	2.2	2.2	....	8
Rockland	2.6	5.0	9.8	2.4	4
St. Lawrence	5.2	6.7	1.3	....	5
Saratoga	6.2	8.2	4.1	12.2	2
Schenectady	19.8	6.1	63.4	18.8	...
Schoharie	....	3.8	....	....	11.
Schuyler	6.3	....	....	....	....
Seneca	7.1	10.7	....	....	....
Steuben	1.4	5.6	1.4	1.4	4.
Suffolk	1.3	1.3	8.6	7.2	4.7
Sullivan	6.2	....	3.0	3.0	2.9
Tioga	7.1	....	3.6	11.0	3.7
Tompkins	9.7	....	....	....	....
Ulster	14.1	26.8	8.0	16.1	1.6
Warren	23.1	11.6	....	....	....
Washington	2.2	17.4	21.6	4.3	....
Wayne	8.2	6.2	....	14.3	4.1
Westchester	5.6	7.5	7.2	5.9	7.6
Wyoming	3.3	....	....	....	....
Yates	....	19.9	10.0	....	....
New York State, cities	12.1	26.1	21.6	18.5	20.3
New York State, rural	5.3	6.3	5.3	5.6	5.8
Reg. States, rural	6.8	7.5	6.1	7.3	7.1

COMPARATIVE RURAL MORTALITY RATES FROM DIPHTHERIA AND CROUP IN NEW YORK STATE BY COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Albany	54.2	29.9	20.8	14.8	8.8	17.5	17.6	41.2	14.8	20.8
Allegany	7.2	7.2	4.7	.....	4.7	7.0	16.4	11.8	2.4	2.4
Broome	57.6	30.4	10.1	6.7	13.3	9.9	23.1	16.5	16.5	6.6
Cattaraugus	7.1	7.1	21.4	8.9	23.2	19.7	14.4	23.6	32.8	7.8
Cayuga	36.2	11.3	8.6	17.3	5.8	11.8	3.0	9.0	3.0	.....
Chautauqua	9.3	11.1	34.9	14.6	3.6	7.2	7.2	16.1	7.1	35.5
Chemung	5.4	22.1	50.6	17.2	29.1	17.8	5.9	5.8	34.8	5.8
Chenango	8.2	8.2	2.7	10.9	8.2	8.2	19.2	8.3	11.1	8.4
Clinton	29.5	33.6	20.9	8.3	14.5	14.4	7.9	18.5	16.0	5.4
Columbia	23.7	23.9	9.0	21.2	6.1	12.3	12.3	12.4	9.3	3.1
Cortland	10.8	5.4	21.5	22.1	.....	11.0	11.1	11.1	.....	.....
Delaware	17.2	10.8	15.1	2.1	25.8	6.4	.....	10.8	6.5	8.7
Dutchess	29.5	29.4	22.4	15.4	15.3	22.1	32.2	20.3	20.2	15.1
Erie	28.3	21.3	26.3	18.7	12.8	16.5	13.2	9.9	6.8	14.4
Essex	13.0	6.4	9.6	3.1	18.7	9.2	12.2	12.2	15.1	12.0
Franklin	53.7	80.2	13.5	13.3	26.0	14.9	53.6	17.2	10.8	4.4
Fulton	13.9	28.1	14.1	14.3	50.3	7.2	7.3	14.7	7.4	14.8
Genesee	83.9	23.0	5.7	5.7	19.7	8.4	7.8	15.5	3.9	19.3
Greene	22.2	28.7	32.0	12.8	12.9	6.5	26.0	16.3	6.6	9.9
Hamilton	.....	.....	.....	40.6	.....	.....	.....	.....	.....	22.4
Herkimer	27.4	50.4	30.7	26.6	30.1	9.3	9.3	25.4	6.9	4.6
Jefferson	5.4	5.5	5.5	16.4	27.3	9.1	14.7	14.7	7.4	.....
Lewis	10.9	18.3	.....	29.7	11.2	26.4	7.6	15.5	3.9	4.0
Livingston	13.5	2.7	16.1	13.4	21.5	8.0	5.3	.....	10.6	2.6
Madison	7.4	9.9	12.5	.....	7.6	10.1	10.1	5.1	.....	2.5
Monroe	14.5	19.7	12.4	31.4	31.1	31.3	35.5	14.8	14.5	18.8
Montgomery	22.6	7.8	39.0	19.4	11.6	.....	26.9	11.5	11.5	.....
Nassau	43.3	18.9	23.0	28.2	27.0	31.7	26.2	22.5	20.4	30.7
Niagara	5.1	17.8	17.7	15.0	17.4	4.9	9.8	3.2	4.7	6.4
Oneida	21.3	14.8	13.2	15.0	23.4	20.2	21.9	5.1	10.1	6.7
Onondaga	13.3	18.2	13.2	8.2	4.9	8.2	8.1	14.5	19.3	8.0
Ontario	2.6	.....	12.6	7.5	10.0	17.4	17.4	7.5	10.0	7.5
Orange	32.7	30.7	30.4	26.6	35.2	28.0	22.2	16.7	11.5	19.3
Orleans	16.6	6.6	16.3	12.9	28.9	9.6	12.7	12.6	37.8	3.1
Oswego	40.9	36.8	8.5	27.1	22.9	21.5	16.8	23.0	6.3	4.2
Otsego	12.3	22.6	2.1	10.3	8.3	4.2	8.4	4.2	4.2	8.4
Putnam	43.5	21.7	43.1	.....	35.6	42.6	28.1	48.8	13.8	6.9
Rensselaer	20.6	34.5	13.0	10.9	10.9	8.8	22.0	33.0	11.0	4.4
Rockland	65.3	32.8	19.5	23.7	32.1	24.5	19.8	17.5	23.8	21.5
St. Lawrence	18.3	25.4	4.0	17.2	10.5	10.4	7.9	17.3	10.8	12.2
Saratoga	32.9	22.5	16.3	8.2	14.2	14.2	10.1	10.1	14.2	10.2
Schenectady	65.9	98.1	169.0	18.8	42.5	7.7	7.4	35.8	20.7	.....
Schoharie	11.1	.....	11.5	7.7	23.5	15.9	.....	12.2	.....	4.2
Schuyler	.....	19.2	25.8	6.5	32.9	20.0	.....	6.9	7.0	.....
Seneca	14.2	14.3	10.8	10.8	7.3	.....	11.0	18.3	7.4	14.8
Steuben	23.7	14.0	12.7	24.2	38.6	20.2	1.8	10.7	1.8	3.6
Suffolk	25.8	11.3	17.1	15.5	15.1	20.5	12.3	10.9	17.2	16.9
Sullivan	9.3	15.3	9.0	26.7	26.3	5.8	17.4	14.6	.....	2.9
Tioga	10.7	7.2	32.8	22.0	11.1	7.5	11.3	22.8	19.2	15.5
Tompkins	4.8	14.7	14.8	15.0	5.1	10.3	5.2	10.4	21.0	5.3
Ulster	31.3	50.5	33.4	16.1	24.3	26.1	27.3	31.6	17.1	12.3
Warren	17.3	5.8	.....	.....	17.5	.....	11.7	5.9	5.9	.....
Washington	30.7	37.0	34.6	2.1	8.5	8.5	8.5	2.1	21.0	18.9
Wayne	8.2	12.3	6.2	8.2	22.5	10.2	12.2	14.2	12.1	12.0

COMPARATIVE RURAL MORTALITY RATES F

Counties	1900	1901	1902
Westchester..........	45.5	33.3	36.8
Wyoming............	9.9	13.1	.....
Yates..............	.....	5.0	10.0
New York State, cities.	55.7	48.9	46.8
New York State, rural.	24.0	22.0	18.1
Reg. States, rural.....	26.5	21.6	17.0

COMPARATIVE RURAL MORTALITY RATES
BY COUNTI

Rates per 100,

Counties	1900	1901	1902
Albany..............	42.2	44.9	23.
Allegany.............	33.7	59.8	35.
Broome..............	27.1	54.0	13.
Cattaraugus..........	48.1	49.9	17.
Cayuga..............	52.9	18.4	22.
Chautauqua..........	52.0	85.0	25.
Chemung............	21.7	99.5	22.
Chenango...........	41.0	92.9	10.
Clinton.............	25.3	48.3	25.
Columbia...........	23.7	71.8	12
Cortland...........	21.5	43.0	48
Delaware...........	30.2	62.4	17
Dutchess...........	34.7	55.3	20
Erie................	27.1	43.8	11
Essex..............	9.8	93.4	12
Franklin............	16.3	50.4	11
Fulton.............	13.9	70.2	14
Genesee............	52.1	71.8	22
Greene.............	31.8	35.1	22
Hamilton...........	....	81.0	20
Herkimer...........	15.7	42.7	3
Jefferson...........	30.9	74.5	29
Lewis..............	10.9	73.4	29
Livingston..........	27.0	40.4	24
Madison............	22.2	76.9	29
Monroe.............	18.1	50.1	7
Montgomery........	15.0	54.7	[illegible]
Nassau.............	23.5	20.6	4
Niagara............	18.0	63.7	[illegible]
Oneida.............	18.0	54.3	[illegible]
Onondaga..........	14.9	57.9	11
Ontario............	28.1	88.9	1
Orange.............	43.6	57.7	[illegible]
Orleans............	16.6	59.2	1
Oswego............	46.6	59.4	1
Otsego.............	10.2	55.4	1
Putnam............	21.8	28.9	1

COMPARATIVE RURAL MORTALITY RATES FROM INFLUENZA — (*Continued.*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Rensselaer	45.4	68.9	19.5	32.6	56.8	24.2	4.4	50.5	66.0	26.4
Rockland	20.9	42.9	12.2	26.0	9.2	24.5	15.4	39.3	15.2	12.9
St. Lawrence	40.5	53.4	21.3	23.8	51.2	30.0	15.8	58.6	43.0	9.5
Saratoga	28.8	110.6	8.2	30.6	26.4	36.5	22.3	34.5	24.4	18.3
Schenectady	19.8	6.1	10.6	9.4	17.0	23.2	.....	14.3	27.6	6.7
Schoharie	11.1	109.3	42.0	42.5	82.2	27.8	24.1	28.4	41.1	16.6
Schuyler	19.0	51.1	71.0	19.6	26.3	40.0	13.5	82.2	69.5	14.1
Seneca	24.9	85.8	18.0	25.3	50.8	61.9	14.6	40.4	77.3	14.8
Steuben	12.5	44.9	8.5	37.0	28.6	17.3	10.7	40.9	30.3	23.2
Suffolk	27.1	33.9	3.7	16.7	24.5	17.1	13.4	27.3	31.1	16.9
Sullivan	31.0	67.1	12.0	29.7	67.3	28.9	14.5	64.2	23.4	23.6
Tioga	60.8	72.2	32.8	36.7	59.2	52.3	11.3	64.7	65.3	34.9
Tompkins	24.2	44.0	34.6	70.1	91.3	30.8	20.7	83.3	73.4	47.5
Ulster	21.9	52.1	14.3	41.7	42.1	47.4	20.9	55.4	23.4	29.2
Warren	23.1	69.4	40.6	29.0	17.5	23.3	5.8	41.0	35.2	11.8
Washington	19.7	78.4	17.3	19.3	51.2	40.2	31.7	65.3	37.8	29.4
Wayne	30.8	69.8	22.6	32.8	30.7	34.8	10.2	38.4	30.2	16.0
Westchester	35.5	46.9	9.2	19.7	18.0	23.8	15.0	28.1	13.2	10.4
Wyoming	26.3	81.8	22.8	38.8	35.4	57.6	12.7	57.1	37.9	31.5
Yates	19.7	89.5	35.2	40.6	71.8	51.8	26.1	42.1	42.4	21.3
New York State, cities	15.6	24.0	6.0	12.4	15.8	10.3	6.2	17.2	11.0	6.7
New York State, rural	28.4	60.2	16.8	28.5	36.6	28.6	16.0	48.2	33.4	21.3
Reg. States, rural	29.6	48.0	14.6	24.8	29.6	29.5	12.9	32.1	26.6	17.7

COMPARATIVE RURAL MORTALITY RATES FROM TUBERCULOSIS OF LUNGS IN NEW YORK STATE BY COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Albany	135.6	104.8	136.8	100.5	149.8	125.5	96.7	103.0	129.9	74.1
Allegany	74.7	64.6	80.7	56.5	53.8	41.8	56.2	63.7	52.3	60.0
Broome	155.9	77.6	94.0	90.2	86.4	82.7	72.7	72.7	118.8	102.2
Cattaraugus	78.3	67.7	57.1	44.7	69.7	73.4	82.9	78.0	80.3	50.5
Cayuga	125.4	118.4	85.6	115.4	116.8	100.5	110.4	108.3	82.0	98.0
Chautauqua	87.3	101.6	93.7	95.0	94.5	83.1	80.9	73.4	74.8	60.3
Chemung	103.3	143.8	118.1	80.1	122.3	112.7	123.5	99.3	110.1	166.8
Chenango	120.3	153.0	117.3	81.7	84.4	111.4	76.7	110.3	80.5	78.3
Clinton	134.9	130.2	121.2	110.3	120.2	125.9	139.2	89.9	159.8	134.1
Columbia	127.7	110.6	135.5	112.2	128.3	169.3	101.8	132.8	123.7	130.1
Cortland	134.7	118.4	75.2	71.7	49.6	93.5	83.0	72.2	67.0	61.7
Delaware	94.8	86.1	60.2	86.0	75.2	90.1	103.5	69.3	60.9	80.9
Dutchess	190.8	231.5	156.5	220.9	242.2	207.2	189.6	209.3	176.7	213.1
Erie	110.7	100.7	86.8	77.2	90.5	84.5	91.0	105.4	78.3	106.8
Essex	143.3	122.4	175.1	129.1	196.2	191.0	165.2	167.3	232.7	231.3
Franklin	233.4	265.7	285.7	265.1	236.6	296.6	281.0	228.6	312.1	291.9
Fulton	188.0	140.3	70.7	92.7	100.6	144.9	138.5	146.5	88.4	118.5
Genesee	144.7	97.6	79.8	96.2	89.9	103.2	58.3	77.5	27.1	115.6
Greene	162.0	181.6	159.8	128.2	138.3	177.4	168.7	198.9	170.5	187.9
Hamilton	80.9	161.9	60.8	20.3	101.7	61.1	125.3	85.5	131.3	.....

COMPARATIVE RURAL MORTALITY RATES

Counties	1900	1901	1902	1		
Herkimer	129.3	122.3	74.9	11		
Jefferson	132.6	125.4	85.5	10		
Lewis	98.5	128.4	77.6	9		
Livingston	110.6	140.1	99.6	104		
Madison	115.9	136.4	92.2	90		
Monroe	105.0	114.4	121.9	97		
Montgomery	109.2	93.8	116.9	101		
Nassau	124.5	125.4	118.0	120.		
Niagara	133.6	84.1	60.7	122.		
Oneida	129.4	107.0	107.5	98.		
Onondaga	127.6	128.9	153.4	113.		
Ontario	109.8	106.6	60.6	108.		
Orange	158.2	120.8	116.3	131.3		
Orleans	126.0	148.0	117.4	90.6		
Oswego	160.8	155.7	136.3	104.0		
Otsego	106.3	119.0	86.5	84.7	1	
Putnam	181.3	173.3	129.4	128.8	1	
Rensselaer	183.7	155.1	103.9	121.8	1	
Rockland	141.0	148.9	141.7	146.7	1	
St. Lawrence	146.5	139.0	101.0	85.8	1	
Saratoga	137.6	157.8	147.1	187.5	12	
Schenectady	125.2	128.7	105.6	141.3	10	
Schoharie	182.5	139.5	137.4	135.3	12	
Schuyler	94.9	83.0	83.9	65.2	98	
Seneca	163.6	221.6	219.0	187.6	221	
Steuben	105.9	101.0	84.7	92.4	118	
Suffolk	168.9	195.9	181.1	212.4	205.	
Sullivan	256.9	344.8	294.8	311.5	494.	
Tioga	128.8	126.3	72.8	77.1	92.	
Tompkins	91.8	92.9	133.6	85.2	81.	
Ulster	142.4	170.5	156.0	158.9	149.	
Warren	144.2	115.6	63.7	168.4	139.	
Washington	140.3	139.3	138.4	96.6	115.2	
Wayne	160.3	112.9	100.5	108.6	108.5	
Westchester	163.3	217.3	155.5	174.1	159.2	
Wyoming	88.8	91.6	94.3	55.0	67.6	
Yates	78.8	104.4	120.5	137.0	102.6	
New York State, cities	217.9	210.1	188.5	193.1	202.7	1
New York State, rural	135.4	137.1	119.3	120.5	127.4	1
Reg. States, rural	138.0	133.7	121.0	121.1	131.6	12

COMPARATIVE RURAL MORTALITY RATES FROM *CANCER*
COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	190
Albany	78.3	65.9	89.2	65.0	58.7	61.3
Allegany	69.9	45.4	80.7	68.3	56.1	71.9
Broome	81.4	101.2	63.8	86.9	53.2	59.6
Cattaraugus	78.3	51.7	58.9	58.9	64.4	71.6

COMPARATIVE RURAL MORTALITY RATES FROM CANCER — (*Continued*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Cayuga	75.2	90.2	65.6	49.1	99.3	68.0	95.5	105.3	127.5	128.6
Chautauqua	70.6	46.2	60.6	74.9	81.8	79.5	79.1	73.4	101.5	92.2
Chemung	38.1	77.4	50.6	68.7	104.9	106.7	105.9	116.8	92.7	97.8
Chenango	87.5	128.4	73.7	92.6	122.4	70.7	84.9	118.5	105.5	100.6
Clinton	42.2	44.1	41.8	25.0	43.5	41.3	36.8	37.0	47.9	56.3
Columbia	65.3	71.8	87.3	78.9	67.2	86.2	80.2	114.3	77.3	83.6
Cortland	118.5	91.5	118.2	88.2	126.7	93.5	110.6	100.0	128.5	101.0
Delaware	58.2	62.4	81.7	77.4	51.5	92.3	75.5	84.5	76.2	89.6
Dutchess	48.6	48.4	75.7	83.9	83.6	86.6	60.9	77.6	77.4	82.2
Erie	66.4	63.9	66.2	44.1	52.2	73.2	56.7	52.7	66.5	60.6
Essex	87.9	64.4	57.3	66.1	56.1	49.3	64.3	76.0	45.3	66.1
Franklin	23.3	34.4	47.2	39.8	60.8	55.5	47.2	43.1	58.5	74.1
Fulton	48.7	77.2	99.0	78.4	71.9	58.0	87.5	95.3	73.7	140.7
Genesee	69.4	89.0	68.4	73.6	89.9	92.0	112.8	85.3	65.7	38.5
Greene	111.2	51.0	60.7	83.4	99.7	106.5	94.1	75.0	98.4	98.9
Hamilton	80.9	60.7	40.6	20.3	20.3	81.5	41.8	64.1	21.9	112.1
Herkimer	78.4	75.6	57.6	72.2	65.9	57.8	65.2	76.3	73.5	75.3
Jefferson	56.3	54.5	60.0	69.2	65.6	76.6	65.9	90.2	77.6	79.9
Lewis	36.5	55.0	77.6	104.1	71.1	67.8	57.3	54.2	94.2	51.7
Livingston	62.1	78.1	70.0	91.4	75.1	101.8	90.7	90.4	108.6	81.8
Madison	98.6	104.1	77.3	87.7	73.1	101.3	109.0	111.7	124.5	96.6
Monroe	63.3	57.2	68.9	80.3	86.3	76.5	76.0	64.2	77.1	58.0
Montgomery	71.6	50.8	46.8	73.8	100.7	100.4	92.3	111.2	84.1	99.1
Nassau	52.3	94.5	63.9	64.3	61.6	63.5	96.5	60.9	72.6	61.3
Niagara	51.4	81.5	65.7	70.2	84.5	56.7	45.6	74.4	94.3	69.9
Oneida	80.2	90.5	79.4	81.5	61.9	75.6	74.0	92.6	106.2	79.3
Onondaga	63.0	71.1	70.9	69.1	80.4	68.8	56.8	88.5	70.7	91.0
Ontario	89.3	73.6	85.9	115.5	65.0	121.8	69.7	67.4	107.5	112.8
Orange	52.7	55.9	42.9	53.2	58.1	75.1	68.3	93.6	86.8	49.7
Orleans	63.0	82.2	48.9	51.8	93.1	57.3	92.0	56.9	81.8	87.8
Oswego	81.8	84.9	69.6	71.2	80.0	84.6	88.2	71.2	104.2	68.5
Otsego	98.1	84.1	88.5	95.1	114.1	104.1	98.2	83.9	111.6	118.3
Putnam	65.3	86.6	79.1	107.3	85.5	56.7	91.4	139.5	76.1	109.8
Rensselaer	88.8	90.5	90.9	84.8	65.6	74.7	68.1	74.7	76.9	85.8
Rockland	33.9	60.6	83.0	47.3	57.4	57.9	72.8	50.3	65.0	81.6
St. Lawrence	57.6	61.5	59.8	59.4	64.3	87.5	67.3	63.9	74.0	86.9
Saratoga	63.7	82.0	73.6	48.9	67.1	73.0	66.9	64.9	67.0	93.4
Schenectady	72.5	42.9	84.5	65.9	68.0	54.2	52.0	57.2	41.4	40.0
Schoharie	67.0	113.1	80.2	61.9	117.5	99.2	80.3	97.4	123.2	145.4
Schuyler	113.9	89.4	129.0	65.2	92.2	66.6	67.6	109.7	90.4	176.4
Seneca	85.4	92.9	114.9	151.5	68.9	72.8	95.1	124.8	121.5	110.9
Steuben	71.1	75.7	73.4	71.1	93.0	96.5	96.0	99.7	114.0	139.1
Suffolk	47.7	69.1	50.2	65.6	80.4	73.9	70.2	61.2	78.4	83.3
Sullivan	77.4	51.9	57.2	32.6	76.1	49.1	58.0	52.5	67.4	58.9
Tioga	96.6	79.4	80.1	95.4	111.1	82.2	98.1	106.5	99.8	108.5
Tompkins	82.1	83.1	39.6	95.2	71.0	113.0	62.1	109.3	83.9	158.3
Ulster	68.9	71.0	57.3	72.2	64.8	68.6	75.5	60.1	76.4	82.9
Warren	86.5	52.0	52.1	98.7	75.6	52.5	76.0	64.4	52.8	117.6
Washington	89.9	78.4	82.2	68.7	53.3	86.9	80.3	82.2	92.5	98.6
Wayne	86.3	71.9	96.4	84.0	88.0	75.6	79.3	99.1	68.4	96.0
Westchester	54.4	58.6	90.0	79.7	77.7	86.8	88.9	101.3	101.4	101.5
Wyoming	49.3	62.1	81.3	61.5	90.1	102.4	102.0	95.2	72.7	88.1
Yates	68.9	54.7	85.4	71.0	66.7	88.1	67.9	68.4	79.4	48.0
N. Y. State, cities	65.9	69.3	68.1	71.9	73.4	75.5	75.7	76.8	75.3	79.0
N. Y. State, rural	68.8	70.6	70.6	71.4	74.5	77.4	75.3	79.8	84.7	86.9
Reg. States, rural	61.5	62.7	63.4	66.5	68.4	71.2	60.8	63.8	64.9	67.2

COMPARATIVE RURAL MORTALITY RATES FROM D
COUNTIES, 1900–1

Rates per 100,000 of pop

Counties	1900	1901	1902	1903	19	
Albany	9.0	9.0	8.9	14.8	26	
Allegany	31.3	4.8	4.7	23.6	11	
Broome	20.3	6.7	3.4	10.0	26	
Cattaraugus	14.2	7.1	16.1	14.3	19	
Cayuga	5.6	5.6	11.4	23.1	23.	
Chautauqua	22.3	12.9	7.4	18.3	16.	
Chemung	16.3	22.1	16.9	11.4	5.	
Chenango	8.2	10.9	24.6	16.3	27.	
Clinton	10.6	14.7	4.2	2.1	6.	
Columbia	5.9	15.0	9.0	21.2	9.	
Cortland	16.2	16.1	26.9	11.0	22.	
Delaware	8.6	15.1	6.5	8.6	21.	
Dutchess	6.9	6.9	8.6	10.3	18.	
Erie	16.0	16.6	10.3	13.2	7.5	
Essex	9.8	22.5	19.1	22.0	18.7	
Franklin	9.3	11.5	11.2	2.2	13.0	
Fulton	7.0	7.0	7.1	21.4	.....	
Genesee	8.7	11.5	5.7	17.0	16.9	
Greene	3.2	12.7	19.2	12.8	9.6	
Hamilton	20.2	.....	20.3	20.3	.....	
Herkimer	7.8	.....	7.7	7.6	11.3	
Jefferson	21.8	12.7	12.7	16.4	9.1	
Lewis	10.9	14.7	22.2	7.4	22.5	
Livingston	10.8	2.7	16.1	18.8	5.4	
Madison	17.3	14.9	10.0	10.0	15.1	
Monroe	10.9	12.5	8.8	10.5	12.1	
Montgomery	3.8	11.7	11.7	27.2	15.5	.
Nassau	1.8	8.6	8.2	14.1	12.0	
Niagara	15.4	10.2	15.2	20.1	9.9	
Oneida	9.8	18.1	3.3	15.0	20.1	
Onondaga	8.3	14.9	11.5	18.1	9.8	
Ontario	10.2	17.8	20.2	10.0	15.0	2
Orange	12.7	10.8	8.9	19.5	10.6	1
Orleans	.....	16.4	6.5	16.2	19.3	
Oswego	19.8	18.4	8.5	11.4	12.9	1
Otsego	18.4	10.3	28.8	33.1	24.9	1
Putnam	14.5	.....	7.2	.....	14.2	
Rensselaer	10.3	8.6	13.0	23.9	6.6	1
Rockland	5.2	7.6	4.9	11.8	18.4	1
St. Lawrence	17.0	16.0	12.0	11.9	15.8	1
Saratoga	10.3	6.1	10.2	8.2	4.1	12
Schenectady	13.2	6.1	.....	9.4	.....	...
Schoharie	14.9	11.3	42.0	15.5	19.6	15
Schuyler	.....	6.4	.....	19.6	32.9	20
Seneca	14.2	17.9	18.0	14.4	25.4	10
Steuben	9.7	8.4	11.3	14.2	15.7	17
Suffolk	6.4	8.8	12.2	14.3	15.1	12
Sullivan	3.1	12.2	12.0	5.9	14.6	8
Tioga	7.1	25.3	3.6	14.7	7.4	18
Tompkins	14.5	14.7	14.8	10.0	5.1	5
Ulster	14.1	7.9	17.5	6.4	6.5	4
Warren	5.8	.....	11.6	11.6	23.3	11

COMPARATIVE RURAL RATES FROM DIABETES — (*Continued*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Washington	6.6	15.2	13.0	15.0	14.9	8.5	14.8	14.8	10.5	12.6
Wayne	14.4	26.7	8.2	10.2	20.5	22.5	12.2	22.2	20.1	22.0
Westchester	10.0	11.7	4.1	11.8	13.3	15.5	10.6	8.5	14.8	18.4
Wyoming	16.4	13.1	16.3	9.7	22.5	12.8	28.7	3.2	19.0	18.9
Yates	....	14.9	10.0	30.4	5.1	10.4	10.4	15.8	15.9	5.3
New York State, cities	11.3	13.2	12.6	13.4	16.0	16.2	16.5	16.9	16.3	16.9
New York State, rural	11.5	12.0	11.4	14.0	14.4	14.1	14.1	16.0	15.8	16.7
Reg. States, rural	10.8	10.8	11.5	12.1	13.3	13.3	12.0	12.8	12.9	12.8

COMPARATIVE RURAL MORTALITY RATES FROM PNEUMONIA (LOBAR AND UNQUALIFIED) IN NEW YORK STATE BY COUNTIES, 1900–1909

Rates per 100,000 of population

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Albany	132.6	113.8	71.4	88.7	94.0	128.4	87.9	108.8	109.3	97.8
Allegany	125.3	83.7	97.3	87.2	116.9	85.9	56.2	115.6	57.1	81.6
Broome	122.2	128.2	73.9	66.8	99.7	112.5	62.8	59.4	56.1	82.4
Cattaraugus	81.9	89.1	98.1	83.9	96.6	71.6	68.5	92.5	94.9	64.1
Cayuga	117.0	98.7	74.2	89.5	105.2	103.5	56.7	117.4	69.8	55.1
Chautauqua	52.0	51.7	88.2	76.8	100.0	84.9	71.9	109.2	58.8	74.5
Chemung	65.3	110.6	90.0	108.7	87.4	94.9	88.2	75.9	92.7	120.8
Chenango	134.0	103.8	92.7	106.3	114.3	141.3	142.4	135.1	72.2	120.2
Clinton	92.8	44.1	52.3	58.3	74.6	128.0	97.2	82.0	63.9	107.3
Columbia	136.6	98.7	87.3	88.0	103.9	92.3	123.3	95.7	102.1	52.7
Cortland	102.3	226.0	96.7	159.9	104.7	115.5	44.2	66.7	78.2	78.6
Delaware	135.7	96.9	131.2	77.4	116.0	105.2	60.4	86.7	76.2	107.1
Dutchess	178.7	126.1	106.6	142.1	134.7	129.1	186.2	167.1	148.1	139.3
Erie	78.7	77.0	87.9	74.9	72.4	91.7	72.8	122.3	79.2	91.4
Essex	101.0	157.8	82.8	47.2	49.8	89.4	58.1	149.0	99.7	84.1
Franklin	121.4	155.8	121.5	101.6	97.7	106.7	98.7	81.9	67.2	122.0
Fulton	125.3	175.4	99.0	156.9	122.2	87.0	72.9	139.2	154.7	81.5
Genesee	89.7	155.1	74.1	70.7	61.8	72.5	62.2	62.0	69.6	54.0
Greene	146.1	121.1	99.1	163.5	138.3	106.5	133.0	127.2	98.4	59.3
Hamilton	80.9	101.2	....	101.5	81.4	61.1	104.4	192.3	65.6	44.8
Herkimer	119.5	98.9	78.7	64.6	84.7	106.3	88.5	83.3	101.1	68.4
Jefferson	99.9	81.8	52.8	43.7	65.6	49.2	73.3	84.6	61.0	81.7
Lewis	76.6	58.7	40.6	52.1	82.3	79.1	91.7	116.2	74.6	127.4
Livingston	62.1	75.5	105.0	110.2	93.9	109.9	85.4	119.6	84.7	47.5
Madison	66.6	76.9	79.8	112.8	131.0	96.2	83.7	175.1	127.0	134.8
Monroe	119.4	112.6	63.6	69.8	98.3	93.9	50.7	82.3	69.0	76.8
Montgomery	52.7	82.1	66.2	62.1	62.0	38.6	65.4	149.6	68.8	91.5
Nassau	115.4	109.9	82.0	65.9	111.2	80.8	79.9	71.5	73.8	73.6
Niagara	118.2	89.2	75.8	62.7	97.0	86.3	61.9	74.4	113.2	73.1
Oneida	134.3	126.7	92.7	106.4	108.7	117.7	87.5	94.3	79.2	119.8
Onondaga	111.0	86.0	95.6	100.4	110.0	78.6	86.0	69.2	80.3	94.2
Ontario	84.2	91.4	108.6	123.1	62.5	94.4	107.1	102.3	65.0	102.7
Orange	87.3	97.4	93.0	85.2	86.3	106.6	93.9	98.6	75.3	91.4
Orleans	79.6	78.9	110.9	93.8	115.6	57.3	63.4	101.1	100.7	72.1

COMPARATIVE RURAL MOR

Counties	1900	
Oswego	141.1	9
Otsego	157.3	129
Putnam	87.0	137
Rensselaer	125.9	125
Rockland	91.4	103.
St. Lawrence	150.4	108.
Saratoga	119.1	168.
Schenectady	59.3	91.
Schoharie	108.0	135.7
Schuyler	158.1	159.7
Seneca	135.2	142.9
Steuben	101.7	148.7
Suffolk	85.1	84.1
Sullivan	145.5	94.6
Tioga	146.7	61.3
Tompkins	82.1	97.8
Ulster	131.5	120.0
Warren	121.2	127.2
Washington	151.2	156.7
Wayne	86.3	82.1
Westchester	124.4	129.9
Wyoming	49.3	62.1
Yates	54.1	54.7
New York State, cities	232.8	175.5
New York State, rural	110.9	106.5
Reg. States, rural	113.9	108.7

COMPARATIVE RURAL MORTALITY RATES F
STATE BY COUNTIE

Rates per 100,000 o

Counties	1900	1901	1902	1903
Albany	114.5	107.8	136.8	141.9
Allegany	67.5	76.5	90.2	70.7
Broome	78.0	101.2	94.0	83.5
Cattaraugus	53.4	71.3	37.5	42.9
Cayuga	75.2	90.2	82.7	69.3
Chautauqua	61.3	62.8	80.9	71.3
Chemung	59.8	49.8	101.2	63.0
Chenango	93.0	76.5	79.1	89.9
Clinton	38.0	39.9	46.0	18.7
Columbia	136.6	122.6	120.5	130.4
Cortland	48.5	80.7	120.0	104.8
Delaware	62.5	71.0	71.0	70.9
Dutchess	45.2	70.8	98.0	106.2
Erie	57.8	71.1	52.5	56.2

COMPARATIVE RURAL MORTALITY RATES FROM BRIGHT'S DISEASE — (*Continued*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Essex	65.1	109.5	66.9	78.7	68.5	80.1	79.6	94.3	93.7	99.1
Franklin	56.0	55.0	36.0	37.6	67.3	72.5	72.9	58.2	43.3	82.8
Fulton	83.6	84.2	134.4	128.3	115.0	130.4	138.5	219.8	162.1	200.0
Genesee	63.7	74.7	62.7	76.4	73.0	86.5	54.4	62.0	61.9	115.6
Greene	66.7	111.5	92.7	99.4	128.6	135.5	123.3	146.8	95.1	154.9
Hamilton	20.2	40.5	40.6	81.2	40.7	101.9	20.9	106.8	43.8	67.3
Herkimer	68.6	91.1	59.5	102.7	90.4	102.5	116.5	90.2	101.1	93.5
Jefferson	36.3	50.9	70.9	65.5	71.0	80.2	55.0	90.2	72.1	78.0
Lewis	36.5	58.7	62.8	66.9	67.4	64.0	87.9	81.3	94.2	91.5
Livingston	72.8	97.0	78.0	91.4	80.5	91.1	58.7	71.8	63.5	84.4
Madison	64.1	71.9	69.8	85.2	85.7	91.2	111.6	78.7	86.4	83.9
Monroe	65.2	82.3	74.2	82.0	67.3	85.2	91.2	80.7	73.9	53.3
Montgomery	71.6	46.9	62.3	69.9	112.3	108.1	123.1	138.1	91.8	114.3
Nassau	79.4	94.5	108.2	103.5	81.1	76.4	88.2	108.5	87.8	112.8
Niagara	48.8	45.9	40.4	32.6	54.7	39.5	84.7	71.1	103.8	92.2
Oneida	67.1	74.1	96.0	73.2	88.6	67.2	89.2	111.1	101.1	114.7
Onondaga	67.9	69.4	67.6	70.7	90.3	85.2	97.4	70.8	75.5	91.0
Ontario	56.2	68.6	90.9	90.4	97.4	82.0	94.6	84.9	112.5	100.2
Orange	80.0	59.5	73.3	99.4	89.8	96.1	87.0	93.6	131.0	93.0
Orleans	59.7	59.2	75.0	103.5	80.2	63.7	66.6	63.2	72.4	90.9
Oswego	118.5	69.3	107.9	96.8	105.7	100.3	113.5	104.6	98.0	116.3
Otsego	102.2	119.0	131.8	138.5	132.8	131.2	140.0	127.9	109.4	118.3
Putnam	94.3	50.5	79.1	85.9	106.9	156.0	77.3	139.5	152.2	151.0
Rensselaer	105.3	79.7	95.2	126.2	102.7	118.6	127.4	125.3	129.7	118.7
Rockland	91.4	80.8	102.6	106.5	103.3	149.2	83.8	83.1	140.8	116.0
St. Lawrence	82.4	44.1	47.8	47.5	56.5	65.3	55.4	62.6	68.6	85.5
Saratoga	67.8	98.3	104.2	144.7	101.6	109.5	99.4	121.7	156.3	127.9
Schenectady	46.1	73.5	52.8	94.2	93.5	77.5	59.4	100.2	103.5	66.7
Schoharie	89.4	105.6	106.9	131.4	70.5	107.1	108.4	129.9	106.8	128.8
Schuyler	88.5	83.0	103.2	52.1	125.1	106.5	47.3	130.2	159.9	70.6
Seneca	106.7	135.8	132.9	147.9	134.1	138.4	106.0	190.8	165.7	129.4
Steuben	65.5	68.7	73.4	83.8	87.3	77.8	124.5	135.3	147.9	169.6
Suffolk	110.8	94.2	121.1	127.7	135.1	126.2	143.7	164.1	111.7	145.8
Sullivan	43.3	67.1	42.1	68.2	108.3	95.3	78.4	46.7	87.9	67.5
Tioga	107.4	72.2	61.9	91.8	96.3	89.7	75.4	102.7	165.1	143.3
Tompkins	67.7	92.9	74.2	80.1	91.3	87.3	77.6	114.5	110.1	95.0
Ulster	56.3	78.9	70.0	85.1	85.8	76.8	72.3	74.4	79.5	106.0
Warren	121.2	109.9	98.5	139.3	128.0	87.4	99.3	70.3	134.9	152.9
Washington	114.0	93.6	67.0	137.4	132.2	114.4	118.3	137.0	124.0	121.6
Wayne	53.5	71.9	65.6	77.8	100.3	112.4	99.6	70.8	94.5	110.1
Westchester	96.6	133.1	102.3	116.1	117.5	106.9	107.4	125.2	140.1	132.6
Wyoming	65.8	65.4	65.0	42.1	70.8	86.4	63.7	82.5	60.0	72.4
Yates	34.5	59.7	55.2	121.8	143.6	57.0	52.2	110.4	53.0	101.3
New York State, cities	140.3	140.9	136.5	142.1	153.9	145.1	147.8	150.8	130.4	135.9
New York State, rural	74.0	79.2	81.0	88.3	91.8	91.9	91.1	101.7	102.6	104.9
Reg. States, rural	63.9	65.8	67.7	73.0	77.1	78.4	69.2	73.9	70.3	73.0

COMPARATIVE RURAL MORTALITY RATES F
NEW YORK STATE BY C

Rates per 100,000

Counties	1900	1901	1902
Albany	51.2	41.9	53.5
Allegany	21.7	21.5	30.9
Broome	33.9	23.6	43.6
Cattaraugus	44.5	44.5	35.7
Cayuga	36.2	47.9	39.9
Chautauqua	37.2	38.8	25.7
Chemung	43.5	27.6	33.7
Chenango	43.8	41.0	24.6
Clinton	50.6	44.1	41.8
Columbia	44.5	53.8	30.1
Cortland	48.5	37.7	69.9
Delaware	43.1	21.5	10.8
Dutchess	72.9	53.5	29.[illegible]
Erie	36.9	50.9	55.[illegible]
Essex	45.6	61.2	25.[illegible]
Franklin	44.3	93.9	54.[illegible]
Fulton	20.9	49.1	42.[illegible]
Genesee	34.7	20.1	17.[illegible]
Greene	31.8	35.1	35.[illegible]
Hamilton	20.2	20.2	40.[illegible]
Herkimer	45.1	38.8	51.[illegible]
Jefferson	49.1	36.4	61[illegible]
Lewis	32.8	25.7	29[illegible]
Livingston	13.5	40.4	26[illegible]
Madison	39.5	27.3	2[illegible]
Monroe	41.6	44.7	3[illegible]
Montgomery	52.7	15.6	3[illegible]
Nassau	68.5	46.4	4[illegible]
Niagara	46.2	43.3	5[illegible]
Oneida	45.9	31.3	3[illegible]
Onondaga	38.1	26.4	4[illegible]
Ontario	35.7	50.8	3[illegible]
Orange	40.0	46.9	4[illegible]
Orleans	76.2	16.4	[illegible]
Oswego	42.3	35.4	[illegible]
Otsego	28.6	32.8	[illegible]
Putnam	94.3	43.3	
Rensselaer	39.2	30.2	
Rockland	73.1	53.0	
St. Lawrence	44.5	38.7	
Saratoga	74.0	51.2	
Schenectady	39.6	36.8	
Schoharie	52.2	18.9	
Schuyler	25.3	57.5	
Seneca	39.1	32.2	
Steuben	25.1	40.7	
Suffolk	47.7	41.4	
Sullivan	27.8	6.1	
Tioga	28.6	32.[illegible]	
Tompkins	33.8	24.4	
Ulster	36.0	45.[illegible]	

COMPARATIVE RURAL MORTALITY RATES FROM DISEASES OF EARLY INFANCY —
(*Concluded*)

Counties	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909
Warren..............	63.5	40.5	29.0	11.6	46.5	52.5	46.7	41.0	52.8	52.9
Washington..........	52.6	32.7	38.9	36.5	38.4	42.4	48.6	59.0	56.8	46.1
Wayne..............	47.3	57.5	34.9	45.1	51.2	45.0	40.7	44.5	58.3	58.0
Westchester..........	73.3	52.2	69.5	51.2	52.1	68.6	54.6	77.5	67.6	55.9
Wyoming............	32.9	22.9	32.5	51.8	45.0	28.8	41.4	31.7	31.6	34.6
Yates...............	24.6	29.8	40.2	60.9	15.4	31.1	41.8	31.5	10.6	21.3
New York State, cities	81.3	70.9	71.0	74.0	76.0	77.5	80.7	80.4	78.0	72.8
New York State, rural.	44.5	39.8	39.0	42.7	42.5	47.6	47.3	49.5	51.1	47.8
Reg. States, rural.....	51.6	49.0	51.1	46.8	53.7	53.3	55.0	55.5	56 1	54.5

NEW YORK STATE MORTA

Rates per 100,000

1907–1

	Population
NASSAU COUNTY	318,376
Hempstead	165,726
North Hempstead	66,922
Oyster Bay	85,700
SUFFOLK COUNTY	367,170
Babylon	34,786
Brookhaven	66,124
East Hampton	18,384
Huntington	45,894
Islip	67,834
Riverhead	20,906
Shelter Island	4,307
Smithtown	23,794
Southampton	41,045
Sag Harbor	13,200
Southold	40,402
SULLIVAN COUNTY	136,41
Bethel	8,64
Callicoon	8,19
Cochecton	4,54
Delaware	7,33
Fallsburg	15,16
Forestburg	2,17
Fremont	7,94
Highland	4,05
Liberty	21,70
Lumberland	2,90
Mamakating	12,02
Neversink	7,13
Rockland	14,13
Thompson	16,74
Tusten	3,5

NEW YORK STATE MORTALITY BY TOWNSHIPS

Rates per 100,000 of population

1908–1910

	Population	Cancer No.	Cancer Rate
NASSAU COUNTY	243,118	165	67.9
Hempstead	127,160	90	70.8
North Hempstead	51,292	35	68.2
Oyster Bay	64,652	40	61.9
SUFFOLK COUNTY	279,723	201	71.9
Babylon	26,423	16	60.6
Brookhaven	49,799	50	100.4
East Hampton	13,914	9	64.7
Huntington	34,951	20	57.2
Islip	52,263	28	53.6
Riverhead	15,798	10	63.3
Shelter Island	3,218	4	124.3
Smithtown	18,970	5	26.4
Southampton	31,763	28	88.2
Sag Harbor	10,008	8	79.9
Southold	30,778	23	74.7
SULLIVAN COUNTY	102,016	52	51.0
Bethel	6,486	4	61.7
Callicoon	6,157	5	81.2
Cochecton	3,415	1	29.3
Delaware	5,509	1	18.2
Fallsburg	11,362	7	61.6
Forestburg	1,634		
Fremont	5,901	3	50.8
Highland	3,059	1	32.7
Liberty	16,256	6	36.9
Lumberland	2,168	1	46.1
Mamakating	8,932	3	33.6
Neversink	5,282	4	75.7
Rockland	10,521	5	47.5
Thompson	12,569	9	71.6
Tusten	2,651	2	75.4

THE CHAIRMAN — Dr. Bush
was engaged with the Legisla
thought he would be serving
him. I will ask Professor Ogd

PROFESSOR OGDEN — I
miration for the gentlem
the most interesting talk
ever heard. He has the g
ends of anyone I know.
such an assorted series of
on in my life.

The subject of this pap
in the State of New York.
can point out to me any
of the rural death rate in t
of the gentleman, I will be
time, my admiration for th

Still I know that he ha
in preparation for the pa
did not read a paper. In
not read, there is a wond
health officers, which is a
I said, which you have n
you when it is printed as
beg of you not to judge the
personally.

There is one thing, how
He has intimated that the
amount of attention to th
neglected giving it to rural
justified. That was not a h
of Health and his assistants
in the state where sanitary
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And they found that the h
cities, and therefore the r
kindly referred, were made
the difficulties under which

* In justice to Mr. Hoffman it
was largely statistical, he did not
few general remarks upon the advi
munities and suggesting the creati
Division of Rural Hygiene.— EDIT

to say that some twelve or fifteen cities since this work was started have changed their water supply, or put in sewerage plants, and have reduced their death rates entirely through this work of the State Department of Health.

It is a triumph that by a predetermined program the death rate, and particularly the typhoid death rate, has been continuously decreased under the present administration of the State Department of Health. It is something we should all be proud of. Now we are coming to the point where it is worth while considering the country; but up to this time the plague spots were in the city. That is why that was done, Mr. Hoffman.

You know the sanitary condition of the community is gauged as accurately by infant death rate as by anything. In the United States as a whole that runs about 150 out of 1,000, about 15 per cent. of the children born, die during the first year. In New York State last year, that percentage was eight and a fraction, only one-half what it is in the United States as a whole. and lower than in any other country in the world. Our rural infant death rate is a model, and it goes to show sanitary conditions in this country, and in this State are not as bad as they might be.

DR. LAKE (of Gowanda)— I want to emphasize what was in my paper yesterday, that I had not time to read, and that is this: in the rural districts of the State we need the house to house inspection. We need an inspection that shall include the premises about every house. I am convinced, I believe, gentlemen, that all of you are, that to-day the death rate from and the existence of typhoid fever may be very largely traced to rural communities. The conditions we find surrounding houses, and surrounding stables, and on the premises of hundreds of people throughout the rural districts of the State need renovation, and the health officer or someone else should be empowered to do it. We are too much under the control of our local boards of health in this matter. Gentlemen, it is a matter of expense, and what does the expense compare with the conservation of human life and the saving that results thereby.

DR. BURR (of Binghamton)— In this connection, and speaking of typhoid fever, the *Standard,* published in Syracuse, this morning contains an article which all the health officers here should read. It is an article by an officer of the Public Health Service, and it gives some statistics on typhoid fever in the United States which ought to make us all hang our heads. This article was read before an association of the presidents of the

life insurance companies of th
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DR. SIMONDS (Carthage)—
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on typhoid fever, and that is
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camps, are sure to have it.
infecting that I can do. It is
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they move into those places.

THE CHAIRMAN — I might say
Department of Health, and that is,
confronted with the necessity of m
like to handle our vital statistics
vast possibilities for improvement
by Mr. Hoffman. But, as Profess
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of the last eight years, during the
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and each line has cost a good deal
Commissioner and his staff that
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as to the Vital Statistics.

MR. HOFFMAN — I plead
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Ogden has said. But nothing could be further from my mind than to reflect upon what the State Department of Health has done or has not done for the rural communities of this State. It was to show what was not being done by the State Department of Health, and what could not be done without a better paid and larger corps of sanitary officers.

Professor Ogden said if you go back to 1900, the rural death rate was 32 per thousand, and during the ten years following it fell to 15, less than half what it was. The city death rate was 25, and it has fallen to 15. In other words, the rural and the city death rates are now practically the same. But there are counties after counties with excessive death rates at the present time.

I want you to understand me clearly when I say that it is only by a study of the true incidence of disease that you can really get to the root of the matter. As the gentleman just stated about the typhoid fever nest in a particular locality: it is facts of that sort which are needed, and not mere figures that convince no one. But it is a great pleasure to sustain Professor Ogden's contention that the rural typhoid rate has gone down. But the rural death rate is what it was ten years ago, and the city death rate has fallen, and you must give more qualified attention to the subject.

THE CHAIRMAN — During the last year in certain sections of the State we have been so unfortunate as to have once more epidemics of poliomyelitis. This is a subject of great interest, and there is no one better qualified to discuss certain phases of it than our good friend who has addressed you before on this subject — Dr. Wade H. Frost of the United States Public Health Service.

A REVIEW OF PROGR
POLIOM

BY WADE H
Passed Assistant Surgeon,

The physician who has a c
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single specific question to ask.
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answered quite satisfactorily.
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that year. Even this work failed to attract general notice until the period from 1907 to 1912, when epidemics outcropping around the world set the students of many countries to work upon the problem.

Foremost among the things we have learned about poliomyelitis in these last few years are a new conception of its pathology, and an altogether new view of its clinical manifestations. Until a few years ago, surprisingly little was known of the morbid anatomy of acute poliomyelitis beyond the fact that it resulted in the ultimate destruction of the motor cells of the anterior cornua of the cord. Now, from an extensive study of cases in the acute stage, we know that the first and apparently most constant change in the nervous system is a leptomeningitis, an infiltration of the pia matter covering the surface of the brain and cord. Following the prolongations of this membrane, the infiltration extends into the substance of the brain and cord, most commonly into that portion of the cord richest in blood supply, namely the anterior cornua. Broadly speaking, we have come to regard the essential changes in the nervous system as a diffuse inflammatory process, beginning as a meningitis, becoming disseminated along the blood vessels, and finally localized, usually in the motor-cell region of the cord, but occasionally in almost any other portion of the central nervous system.

To be sure, there is much that is still obscure in the pathology of poliomyelitis. It is still undetermined how the virus reaches the brain and cord, though Flexner's recent work may be taken as showing that extension along the lymphatics from the nose to the adjacent portion of the brain is at least a possible route. Again, some recent work has suggested that the damage to the motor cells may be, after all, not wholly secondary to infiltrative changes, but, at least in part, due to the selective action of a toxin upon these cells. Still, we have at least so broadened our conception of the pathology of poliomyelitis as to have prepared our minds for its widely varying clinical manifestations.

It is, perhaps, in the clinical recognition of poliomyelitis that the greatest advance has been made in recent years. It is, I believe, not an exaggeration to say that cases of poliomyelitis which ten years ago would hardly have been diagnosed correctly in any

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ginning with the development of paralysis, and continued unremittingly through that long, discouraging period when the results are almost imperceptible. The results which may be attained by the most careful treatment are necessarily limited, conditioned upon the extent of damage to the motor neurons, but it is becoming more and more evident that much of the deformity and disability which has generally been considered inevitable can be prevented and much more remedied by proper care.

In regard to the cause and transmission of poliomyelitis, a great deal remains obscure at this time; but a firm foundation of definite facts has already been laid. It is now but little over three years since poliomyelitis was definitely proven to be an infectious disease, due to a living micro-organism or germ, experimentally transmissible to monkeys, and, as more recently shown, communicable in modified form to rabbits. Of the infective agent or virus we know that it is, as compared to most of our known pathogenic germs, exceedingly minute, so small that it passes readily through the dense Berkfeld and Chamberland filters, and is scarcely, if at all, distinguishable with the most powerful of modern microscopes; and that it cannot be successfully cultivated outside the living animal body. In these characteristics it is not peculiar, resembling the large class of so-called filterable viruses. Of the biology of the virus we know rather more than of most filterable viruses. Its resistance to various physical and chemical agents has been quite accurately determined.

Its distribution in the body of infected persons and animals has been painstakingly studied. As the result, we now know that the virus occurs in the bodies of persons in the acute stage of poliomyelitis, in the brain and cord, in the mesenteric and other lymphatic glands, in the tonsils and naso-pharyngeal mucous membranes, in the blood and cerebro-spinal fluid, though apparently only at certain stages of the infection and in great dilution, and finally, in the mucous secretions of the naso-pharynx and of the intestine.

More recently it has been shown that the virus may persist in these secretions for many weeks after the acute stage of the infection, and that it may even be present in the buccal and intestinal secretions of persons apparently quite well, who have been in inti-

mate contact with cases of polio
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In addition to these demonstr
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poliomyelitis, not only by injecti
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stomoxys calcitrans, Linn.

In regard to the eminently p
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work, is not appropriate at thi
solution of the question appears,
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In addition to the laboratory a
much has been done in recent y
ology. In this country the Uni
many state health organizations
York, Pennsylvania, Washingto
municipalities and various med
attention to collecting statistics
study of epidemic outbreaks.

This work, essentially less spe
tory experiment, has appeared
pointing in its results, since it h
clusively the origin and mean
knowledge so acquired has, in r
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the systematic observations of many sporadic cases and epidemics that we are enabled to arrive at any generalizations regarding the essential characteristic peculiarities which this disease exhibits in its natural occurrence.

To give some examples of the epidemiologic peculiarities which have now been established as characteristic of poliomyelitis, it is known to be of practically world-wide distribution with a rather marked preference for the northern latitudes of the North Temperate Zone. It occurs endemically in sporadic cases, which, to be sure, may prove on closer study to belong to small unrecognized groups, and also occurs in more or less extensive epidemic outbreaks. A well-marked seasonal prevalence, reaching its maximum in the late summer and fall, decreasing almost to nil during the winter and early spring, is now established as a constant characteristic of endemic and epidemic poliomyelitis. We may now also consider as characteristic of epidemics of poliomyelitis that they occur simultaneously over wide areas of country, in widely-separated districts, attacking within these areas only a small proportion of the total population, affecting young children much more commonly than adolescents and adults. It is also quite generally true that epidemics are more severe in rural districts and small towns than in the large densely populated cities, and that the cases in an epidemic outbreak are characteristically scattered in such a way as to show little, if any, evidence of contact between cases, no obvious relation to common food or water-supplies, and no very definite relation to such conditions as overcrowding, uncleanliness, dampness, previous general health or racial descent.

These and other facts which have been learned regarding the natural incidence of poliomyelitis, must all be added to the results of laboratory experiments before we can finally arrive at a well-balanced, accurate idea of the sources, vehicles and routes of infection. It is doubtful whether the significance of the known facts can be accurately interpreted at present; but that they have a significance cannot be doubted, nor need there be any doubt that this significance will become more and more clear as other facts, as yet undiscovered, are established.

To sum up the achievements of the recent study of poliomyelitis — it has resulted in a better and broader knowledge of the

pathology of the disease, a much mor
nition of cases, and more efficient tr
ogy, much definite information has l
essential cause or virus of poliomyeli
have taught a great deal about the na

To be sure, the progress has not y
goal — sure prevention or certain
great deal of ground which must of
before a broad understanding of th
In the course of the studies, many
tered in the way of prevention and
outlook, at some stages, most discou
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hopeful than ever before. The fa
develop a means of either preventio
sidered as disappointing; it should

THE CHAIRMAN — It is true that poli
astrous disease, but it has one feature
various types of deformity, which make
citizen than the ordinary one. So the
is an important one. Therefore I have
words.

DISCUSS

DR. HARLAN COLE (New York
Department of Health) — I cann
which Dr. Frost has given you, b
he has mentioned and one or two
minutes. I will try to draw your

The first is the later view of th
tion. It is a meningitis more th
the substance of the cord.

It is my pleasure to be able
subject, and I would say that i
and the physician, instead of lo
inevitable situation, considers it
can prevent the inroad of it to t
limit some of the results as show
go about the country with a brac
skirt.

The next point is where a def

out of the disease. In the beginning it is what it appears to be; but cases that have gone on for some time, you may estimate that they are, to use a peculiar expression, twice as bad as they are. That is, a certain amount of the inability, of the weakness which they show is due to the original disease, but a large part of it, and an interesting larger part than you are prepared to believe, comes from a deviation of some part of the extremity in consequence of the original disease, and this deviation brings about as much difficulty as the original weakness. Thus, if a knee or a foot is driven out of alignment by the superincumbent body, there is a limitation of possible motion and you have a degeneration. Whenever you put on your apparatus, be sure your extremity is brought into the natural relation which the fellow extremity occupies, else mobility will be impossible, muscular action will be impossible, circulation will be reduced, and weakness and atrophy will result.

The time during which improvement is possible is as obscure as the cause of the disease. I have known cases after thirty-five years of atrophy and inability, to develop greater ability in consequence of restoration of position and the development of possible action and use of the extremity. This suggests an opportunity for the general practitioner.

Another thing which is particularly to his advantage is that he sees the cases in the beginning. Often in consequence of long continued disability, the patient will put an extremity in an abnormal position, and keep it there, just in that one position, for months; a child may adopt a position out of alignment, which prohibits the restoring the natural position afterwards. The particular warning is that whatever apparatus you apply to the extremity be sure that correct alignment is brought about and motion of proper normal amount is the result of your treatment.

THE CHAIRMAN — One of the centers of infection this year was in the city of Buffalo, and Dr. Edward Clark will talk for a few minutes out of his experience in that city.

DR. EDWARD CLARK (Buffalo)— During the past year, as some of you very well know, we have had in the city of Buffalo and western New York something like 400 case of poliomyelitis. I was delegated by the State Commissioner of Health to do what studying I could in observing some of these cases. I saw a large portion of them, and it was my special good fortune to see a good many of them in connection with our esteemed friend, Dr. Frost, who has just given you such an elaborate paper and such a brilliant resumé of the present knowledge which we possess on the subject of poliomyelitis. And I want to express to

Dr. Frost at this time, before it
appreciation of the paper which h
ing; but I want also to congratul
privilege you have enjoyed in he
you after the most careful study, b
expert in this country on the subje

Dr. Frost has covered the gro
painstaking manner, so that he abs
to discuss his paper, unless the m
of the sin of repetition. I want t
which he has touched upon.

Poliomyelitis has been a sort of
as no one knows when or where
People are panicky when it stri
hold up their hands in holy horr
doctors know no more about it th
Practically, it is no worse than
recognize the effect of many dise
of them.

During the last four or five y
this disease by many eminent scie
starting with the study in Swed
demic of 1905; these men have
different angles and standpoints
material has been collected, wh
so that the ordinary physician
studies and observations. But
you will have a chance to know
perts know about this malady.
about it than we did five or ten
little about it. Up to one year
Dr. Frost, I was one of the me
to arrive at a diagnosis of poli
curred. I have had occasion t
I believe where poliomyelitis is
average physician will be able
occurs, because many cases do
abortive type. A clinical stu
be nervous troubles, which occ
you to a diagnosis that is absol
duty of every physician to st
these epidemics, and commit
have them published, as no one
a discovery which will make yo

the treatment of the disease. Poliomyelitis is a meningitis, and the primary symptoms are meningeal. The others follow later.

We are told this disease can be communicated by virus. We have not yet had the practical organisms isolated, but we hope it will be done in a short time.

Dr. Frost and others have done recently some remarkable work on the place which the stable fly plays in this work. He found that monkeys infected with this disease when confined in a cage with the stable fly, after a while taking these flies and putting them into a cage where there were monkeys which had not yet been affected by the disease, that it made the well monkeys sick. This proves that the fly is the carrier, if not in host, of this virus. He has told you the disease prevails in the latter part of the summer and in the early autumn. I was raised on a farm and brought up in the country, and I know if there is any time in the year when the stable fly is active, it is August and September. He will bite then better than in May. And this leads to the conclusion that this fly is the guilty creature after all.

It has been developed by Flexner and others that the germ of this disease, or the virus of this disease, is carried in the nasal secretions of the nose of individuals having it; and there is no doubt but that it is carried in the nose and throat secretion to individuals who do not have it. That is a point in preventive treatment. If you have a case of poliomyelitis in the family, see that you treat and disinfect the nose and throat of each person in the house who is well, as well as the others. I have no doubt from the way this disease acts that it is many times transmitted by a person who has no symptoms of the disease. Everybody knows how readily one carries around diphtheria germs in his throat; there is probably not a person within hearing of my voice who has not carried diphtheria germs in his throat and nasal tract. When you get a case of poliomyelitis in the family, be sure and see the throats of the other members of the family are treated, and disinfected, and kept thoroughly clean.

Then, take care of your manure piles. In the cities we have not troubled with that as we box the manure piles up and disinfect them. In the country you do not do that; but you must wage eternal warfare on the fly. And the thing to do is to take care of your manure piles and garbage heaps as a first step. You need not do it yourself. I know $25-a-year health officers cannot do much work personally in this field. You can instruct the

people to do all in their power, and th
from this fly, this stable fly and the or
have been told that the rural death rat
high. Don't forget that the fly is th
mischief.

DR. TOWNE (Schenectady)—Another
we are interested as health officers in the
of that infection, as we are responsible
demics. As long ago as three years, the lat
cessor as health officer in Schenectady, r
County Medical Society in which he offe
main carrier of poliomyelitis was the ho
theory on these facts: Dr. Elsner and ot
ments have proved that the virus is no
On the other hand, it was observed, and
bear me out, that most epidemics occur in
when it occurs in the late fall it is checke
weather; and the inference on Dr. Clougl
insect was the carrying power, and the c
insect was killed with the frost; and he ju
that it was the house fly. It was exceedi
to note that the stable fly is one of the kn
At that time we had a short epidemic, in
One of those that came under my observ
four bites on a child's leg, which was call
the mother.

DR. W. S. MCGILL (Director of State H
I will ask a few moments' indulgence, as it
of late to assist in the poliomyelitis sessio
Congress held at Washington. It was my p
foreign languages, and part of my work was
the foreigners, so I had a personal an
Dr. Lansdeiner, who demonstrated the inf
and throat, who was confirmed in his c
notably by Dr. Peterson. It was at this ses
made his communication of transmitted
biting of a stable fly which had been in con
monkey. It was discussed thoroughly at th
publicly — and here if you permit me to r
my friend, Dr. Clark's statement, the lates
paralysis was published in English; it was
tribute to the Congress by the Swedish gove
all their laboratory work were published in

epidemiological studies. There was the report of many thousands of cases which occurred in Stockholm, and the resultant tabulation of those protracted experiments which have so excited the admiration of students all over the world that the French government approved of Lavidette working with the Stockholm investigators.

It was said in this seance at the Congress when Professor Rosenau reported his experiments, that, without doubting the experiments and the beauty of the demonstration, it should not be taken as the means of transmission of this disease. It might be a beautiful laboratory experiment; it might be possible to prove that the stable fly can transmit the disease; but, said Peterson, when we have our epidemics in Stockholm we do not have the stable fly, it is in the winter; and in many places where we have violent epidemics the stable fly is not known.

We have had it pointed out that we have poliomyelitis in the fly season in this country; in the northern countries of Norway and Sweden their great epidemics occurred in the cold winter time; so, bear in mind that we have the biting stable fly as a beautiful experiment and contribution to our knowledge of the matter, but it is not proving the whole proposition or demonstrating that that is the sole or general means of propagation of this epidemic. This is decidedly another point.

Without wishing to detract from the recommendation of the treatment made or the precautions to be taken, I wish to say that that is not all. Probably the entire mucous covering of the individual is showing these germs — that is, the entire mucous of the digestive tract; so do not imagine that you have rendered an individual harmless by the disinfection of the nose and throat by a naso-pharyngeal disinfectant. I said to Dr. Peterson —" Doctor, where people who have not been in contact with the cases for years show this germ, what is the desirability as to quarantine?" He said, " You must quarantine them all."

DR. FROST — We certainly must not be hasty about drawing a conclusion about the stable fly being the only carrier. Still, this was first described by Linneaus of Sweden. I have been informed by a number of Swedish residents that they have their stables and their houses close together.

In regard to the prevalence of the Swedish epidemic, we have the epidemics in this country in the summer and fall, but they have had some epidemics in the winter, which we have not had over here, but which we must consider.

Another thing I wish to emphasize is the importance of the work of your State Department of Health getting physicians to

report cases and then comparing the studies. It is only through certain studies in Massachusetts that there has been a lead given toward the study of insects and their part in transmission. It was these collective studies that gave the lead. They have been, I think, among our most valuable contributions. We should remember that these contributions were made by the practicing physicians and the local health officers, with the understanding that they have a great personal part in the determination of knowledge on the subject of poliomyelitis.

THE CHAIRMAN — The next paper is by Dr. Shaw of Albany, the Consulting Pediatrician of the State Department of Health, and his subject is "The Prevention of Infant Mortality."

DR. HENRY L. K. SHAW (Albany, N. Y.) — Mr. Chairman, ladies and gentlemen, I think it is unnecessary for me to remark in the first place what a great privilege I consider this to be to be able to present this paper before an audience such as is before me. It would have been audacious for me to attempt to cover the entire subject for the prevention of infant mortality in the few minutes I have assigned to me. So I have taken the privilege of confining my remarks, Mr. Chairman, to the question of infant mortality in connection with its relation to the health officer. So my paper's title should be "The Health Officer and Infant Mortality," rather than the wider topic of "Prevention of Infant Mortality."

THE HEALTH OFFICER AND INFANT MORTALITY

By Henry L. K. Shaw, M.D.

Consulting Pediatrician, New York State Department of Health

The problem of infant mortality is great enough and grave enough to demand the earnest attention of the health officer. Professor Wilcox, in his study of the vital statistics of this State, said that "there are three cities in which more than one-fifth of the children born die during the first year, and there is one city in which more than one-half die in the first year, a condition perhaps without a parallel in any other city, American or European, and one calling for immediate correction by the co-operation of the local health officers." Competent observers and students on this subject have shown that at least one-half of the deaths of infants are preventable and this startling and appalling fact demands our serious consideration.

Never in the history of the world, certainly not in modern times, has so much intelligent and earnest effort been directed to the care and welfare of children as to-day and "Save the Baby" has become a popular slogan. The health officer is the appointed guardian of the health of the people in his community. All efforts along this line should be inaugurated or at least directed by him.

The registration of births in this state is shamefully neglected. Dr. Oressy L. Wilbur says that, "Nothing can be done in preventing infant mortality until we know where the babies are and when they arrive," and that "this is the key to the situation so far as the vital statistics side is concerned." He further refers to the fact that many cities in the United States register only 20 per cent. of their births. The experience in Rochester is of interest in this connection. In 1910, the health officer required the sanitary inspectors whenever they inspected a house, to ask if there were any children in it under two years of age. If so, they were reported to the registrar of vital statistics to see if the birth had been recorded. The school nurses and milk station nurses gathered similar statistics, so that the number of births in 1910 was

over 20 per cent. more than in 1
the baptismal records in the
official records and it was found
previously unrecorded.

The law in this state is direc
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see that its provisions are fully ar
ney General Carmody recently re
that if any physician fails prompt
the proper authorities his license t
Our own State Department of Heal
for a more complete registration of
wives must file certificates within th
if unable to do so, a special report
be made within that limit. A system
oughly enforced will aid in the compl
Eugene H. Porter, commissioner of
date of July 10, 1909, states that "
passed and personal feelings on the
whose duty it is to see that the law
aside. It may as well be known now th
and that proper steps for its enforceme
as violations of the law occur."

I wish to call your attention to the fol
adopted by the American Association fo
tion of Infant Mortality:

"Whereas, The registration of all bir
most essential for the study of infantile
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causes, therefore, be it

"Resolved, That the American Assoc
Prevention of Infant Mortality cordially
law for the registration of births and de
by the American Medical Association,
Health Association, and the United States
and urges the thorough enforcement of suc
charged with the responsibility of their e
cution of physicians and midwives who ne
their clients and to the public health by fai
register births as required by law."

The health officer could have a map prepared of his community on which the location of each death of a child under five years is located. This would at a glance reveal graphically and convincingly the dark spots of infant mortality in his territory. He could then make a personal investigation of the sanitary conditions and surroundings of these afflicted homes and remedy defects so that the location becomes more healthful and livable.

Gastrointestinal disorders claim the largest number of victims among infants, and perhaps the largest single factor in their production is impure milk. For this reason, the health officer should study with great care the dairy conditions and the milk distributing agencies in the locality over which he has charge. The State Department of Agriculture would willingly co-operate in inspecting and scoring the dairies, but the problem of the milk peddler and the education of the housekeeper on the care of milk in the homes are a part of the duties and responsibilities of the health officer. The city, town and village authorities should provide the three vital essentials for the baby — fresh air, pure water, and clean milk, and the people look to the health officer as their representative in securing these necessities.

Ignorance — not indifference — on the part of the mother is the cause of much needless sacrifice of life. The average mother hungers after knowledge and her appetite should be appeased. She is the natural custodian of her child and efforts should be made to educate her in the first principles of baby hygiene. The health officer has not the time or opportunity to do this, even if he has the inclination. He can, however, see that this is done by proxy. A visiting nurse attached to his staff would literally perform miracles and would be the direct means of saving many infant lives.

The average cost of a baby's funeral and sickness has been estimated at $50, so that it does not require a very close calculation to say that her employment would be a profitable investment. In 1911, there were 383 deaths under one year of age in Syracuse. It cost the people of Syracuse nearly $20,000 to bury these babies. If one hundred could have been prevented, which is a conservative estimate, it would mean a saving of $5,000, and Syracuse

would have a hundred more babies and there would be happiness instead of sorrow in a hundred more homes.

A nurse should visit the home of every baby whose birth is reported and see if her services and advice were needed. This, of course, applies to the families of the poor where a trained nurse is not employed. The health officer of Syracuse inaugurated a system of visiting new-born babies last summer during the months of July and August. He employed the school nurses who otherwise would have had nothing to do, and they visited 165 new babies. In a number of these cases the nurse made six to ten visits and assisted the mother in bathing the baby and giving general instructions, and in one case her persistent efforts saved the eyesight of a baby that was suffering from ophthalmia neonatorum. None of these babies died while under observation of the nurses. Dr. Palmer, under whose direction this work was carried on, states in his report that the work has proved a great benefit both in an educational way to the parents in matters of hygiene and in addition there has been accomplished a great deal of good in caring for the infants themselves.

In an address before the women of the Grange at the State fair in Syracuse last September I advocated the employment of rural visiting nurses. There are a number of agencies at work in our cities to improve the condition of the poor and to care for them when sick, which results in saving many lives, but little or nothing is being done along these lines in the country districts. That there is an urgent need for such work in the country is shown by the fact that the rural death rate in New York State is greater than the urban. The employment of nurses can be easily secured in the larger cities but it is more difficult to obtain a nurse for this work in the small villages and rural communities. District nursing has been established on a national basis in Australia so that the services of the nurse reach the poorest and most remote sections of the country. Canada has established a chain of small hospitals from Vancouver to Labrador which serve as centers for each nurse whose work radiates from these points. There are a few scattered rural nursing associations in the United States and but one in New York State. This is in Westchester county, where several small villages united in supporting visiting nurses

on a co-operative basis. The nurse receives from ten to fifty cents a call according to the circumstances of the family. The American Red Cross has recently decided to undertake the organization of a rural nursing service and a special committee has been appointed to work out a definite policy. This committee has not yet made its report but it seems probable that the Red Cross will undertake the selection of nurses for rural communities who have had training in visiting work, and will recommend them for positions and maintain some supervision over them.

The State Department of Agriculture is very kind to the farmer. It sends experts to examine his soil and advise the kind of crops to be sown and the rotation to be followed. Should his hogs die from some unknown cause, a thorough study and investigation is made. Cow-testing associations are being arranged and supervised by the department in order to improve the stock and prescribe scientific and balanced rations. The baby should be and is the most important item of live stock on the farm and the State Department of Health should be able to do as much for the babies as is being done for the cows.

Professor Winslow recently said that " the visiting nurse is the most important figure in the modern movement for protecting public health," and I believe that an organized system of visiting nurses should be established in this State. The State Department of Health could very properly establish a division on district nursing, which would not only be far-reaching in its usefulness and of great assistance to the doctors, but would become a larger factor in lowering both the infant mortality and the large death rate among our rural population.

THE CHAIRMAN — I have a telegram from Dr. Adriance, who says he will not be here to open the discussion on Dr. Shaw's paper, therefore the discussion is thrown open to the floor.

DISCUSSION

DR. ROBINSON (of Lackawanna)— I am interested in this paper by Dr. Shaw because he has alluded to certain cities which have a very great infant mortality. Dr. Shaw did not mention any names, but the city of Lackawanna, of which I am health officer, has perhaps the reputation of having the heaviest infant mortality in the State of New York. In fact I have heard it

said that Lackawanna has the greatest infant mortality in the whole country. Here is where vital statistics enter. Of the infants that died in the city of Lackawanna last year, I think our total was something like 378 deaths. Of this number, 212 infants died in one institution. That takes over 50 per cent. of the deaths that occurred in the city of Lackawanna. Not one of these infants was born in the city of Lackawanna; none of them was a resident of the city of Lackawanna — by that I mean that they were not children who had lived in the county three months, or in the state one year. These children were born of parents who were infected with venereal diseases. Dr. Shaw, in giving some of the causes of infant mortality, did not mention that,— the ancestors of the children; but I believe this is a very important consideration to be kept in mind in considering infant mortality. Last year the death rate given to Lackawanna by the Division of Statistics of the State Department of Health was something like 26.2 per thousand. I figured out the actual deaths that occurred in the city among residents,— that is, I excluded the 212 that occurred in this institution, and some 6 or 7 others which were deaths due to violence — the people did not live in the city of Lackawanna; and after excluding all these and adding a certain number, I think it was 8 or 10, who died in hospitals in Buffalo, and who really were residents of the city of Lackawanna, our actual deaths gave a rate of 11.66 per thousand; which I think compares very favorably with most of the cities of the state.

DR. JOHN H. WILSON (Poughkeepsie)—For the encouragement of the health officer in the smaller cities I should like to say that in beginning the work of milk stations, the work of saving babies during the summer, there is nothing that meets with more hearty approval on the part of the people, and there is no more encouraging or satisfactory work that the health officer can do.

In regard to vital statistics; vital statistics are the foundation of child welfare work. I have been health officer in Poughkeepsie, a city of 20,000 inhabitants, for thirty years, and I have conserved the good-will of the physicians, and they are all friends of mine. In talking with Dr. Cole last winter and going over the matter, he said to me, "You know how many babies die, but you do not know how many are born." When I started my milk station I registered fifteen. I would not want the State Department of Health to know it, but only 64 per cent. of our babies born were registered, and I thought all of them were registered. So, when you go home I think you can do a great deal of good

work by finding out how many babies are born in your community.

As to visiting nurses: There is no more important work that the visiting nurse can do than to confer with the health officers. We have not been able to reduce infant mortality in children under one month of age. They die from prematurity and malformation; and the way to get at that is to get at the expectant mother.

DR. SHAW — I was glad to learn that the fair name of Lackawanna has been cleared. I think there is something to look into at Lackawanna if there is an institution where 215 children die each year. That certainly is a problem which should be reached.

I thank Dr. Wilson for his remarks. I think I will restrain myself from entering into the causes of infant mortality. I tried to confine myself to the questions which affect the health officers, as I stated in the beginning, and did not cover the broad question of infant mortality.

I want to second the remarks of Dr. Wilson on one point, and that is, that when each health officer returns home, he should take up the question of the number of children born in his community. A correct report in these cases would help very much.

THE CHAIRMAN — Yesterday afternoon at the meeting of the Sanitary Officers' Association a good deal of discussion arose over the question of the temporary care of the insane. We are privileged to have with us to-day the fountain and source of information on this subject, Dr. James V. May, the President of the New York State Hospital Commission, who will speak to the subject, "The Temporary Care of the Insane by Health Officers.".

THE HEALTH OFFICER A INSANE PENDIN

BY JAMES V.

President, New York Stat

The duty of caring for the in
making proper arrangements for t
which has heretofore devolved upo
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Insanity is not a crime, and tho
diseases are not criminals in the
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officers outside of the city of New York and the county of Albany are required to "notify the health officer of the town, city or village of any poor or indigent insane, or apparently insane person within such municipality whom they know to be in need of the relief afforded by this chapter." (Sec. 87, Art. 4, of the Insanity Law; Chapter 27 of the Consolidated Law of the State of New York.) "When so notified, or when otherwise informed of such fact, the health officer of the city, town or village, except in the city of New York and the county of Albany, where such insane, or apparently insane, person may be, shall see that proceedings are taken for the determination of his mental condition and for his commitment to a State hospital. Such health officer may direct the proper poor officer to make an application for such commitment, and, if a qualified medical examiner, may join in making the required certificate of lunacy. When so directed by the health officer it shall be the duty of the said poor officer to make such application for commitment."

The provisions of this section have been quite generally misunderstood and have led to disputes in more than one instance. The question as to whether or not the health officer could insist upon acting as one of the examiners in lunacy has been referred to the Attorney-General of the State, whose decision reads as follows:

"Powers and Duties of Health Officers and of City, Town and County Poor Authorities Relating to the Insane — Insanity Law, Sections 82, 87.

"Section 87 of the Insanity Law does not compel the designation of a health officer, who is a qualified examiner in lunacy, as one of the physicians to examine a person alleged to be insane and make the required certificate of lunacy.

"All city, town or county authorities having duties to perform relating to the poor, except in the city of New York and the county of Albany, must notify the health officer of the town or of the village of any poor or indigent insane or apparently insane person within such municipality whom they know to be in need of the relief conferred by the Insanity Law.

"Any such city, town or village officer who fails to make such report violates section 1857 of the Penal Law, making such offense a misdemeanor, and is subject to removal from office.

"The overseer of the poor of a town or a superintendent of

the poor of a county, while required to report such cases to the health officer, may also apply direct to the court for an order for the commitment of such insane person in the manner prescribed by section 82 of the Insanity Law.

"The terms 'poor person' and 'indigent person' are defined by section 2 of the Insanity Law. * * *

"In my opinion the Insanity Law does not require that the health officer, if an examiner in lunacy, must be designated as one of the examiners to join in making the required certificate of lunacy. Section 87 of the Insanity Law requires the county and town authorities, having duties to perform relating to the poor, to notify the health officer of any poor or indigent insane or apparently insane person whom they know to be in need of the relief conferred by this chapter. When so notified, or when otherwise informed of such fact, the health officer shall see that proceedings are taken for the determination of the mental condition of such person and for his commitment to a state hospital. In the performance of this duty, the health officer should cause an investigation to be made, designating the physicians to make the examination in lunacy, and, if a qualified medical examiner, may himself join in making the examination of the person and the required certificate of lunacy. After the certificate of lunacy has been made, the health officer should direct the proper poor officer to make an application for the commitment of the alleged insane person in the manner prescribed by sections 80 and 82 of the Insanity Law. * * *

"Any of the persons mentioned in section 82, including the overseer of the poor of a town, or the superintendent of the poor of a county, may present a petition to the court accompanied by the certificate of lunacy of the medical examiners and apply for the order of commitment. As the law now stands, while it is the duty of the poor authorities to report to the health officer, as provided by section 87 of the Insanity Law, an overseer of the poor of a town and a superintendent of the poor of a county may make an application for the commitment of an insane person upon his own initiative.

"In the case where an application is made by the poor authorities or by any other person mentioned in section 82 of the Insanity Law, it is not necessary to designate the health officer as one of the examiners in lunacy. It is not mandatory in any case that the health officer, if qualified, be one of such examiners. He may, when qualified, when the case is called to his attention, join in making the certificate of lunacy.

"The care, treatment and confinement of the insane is an important subject and in many cases requires speedy attention. It was probably for this reason that the Legislature has not con-

ferred upon any one particular local officer exclusive jurisdiction in relation to the subject.

"Concerning the second inquiry as to the failure of the physician for the town poor to report to the health officer of the existence of cases of alleged poor and indigent insane, the remedy against such physician for failing to report to the health officer as provided by section 87 of the Insanity Law is the same as the remedy against any town official for any other breach of duty. Section 1857 of the Penal Law makes a wilful omission of duty by a public officer punishable as a misdemeanor. In addition such omission of duty subjects a public officer to removal from office."

The health officer is required to provide for the proper care, treatment and nursing of the alleged insane person, "as provided by law and the rules of the Commission, pending the determination of his mental condition and his commitment and until the delivery of such insane person to the attendant sent to bring him to the state hospital." (Sec. 87, Insanity Law, page 77.)

When an order for commitment has been made the health officer shall see that such insane person is, without unnecessary delay, transferred to the institution to which he has been committed. In the interim patients must not be confined for a period longer than 10 days and must not be committed to or detained in a prison, police station, jail or any other place intended for criminals. The health officer shall see that the alleged insane person is cared for in a place suitable for his comfortable, safe and humane custody pending the determination of his sanity and his removal to an institution, if such be found necessary. (Sec. 87, Insanity Law, page 78.) "Such person shall not be confined in any such place without an attendant in charge of him, and the said health officer shall select some suitable person to act as such attendant." A female attendant should be provided in the case of women and the patient should never, under any circumstances, be left alone until delivered to the custody of the attendant sent by the state hospital. No mechanical restraint should be used and no drugs administered except by order of the health officer. The law authorizes the city, county or town authorities to provide "a permanent place for the reception and temporary confinement, care and nursing of insane or alleged persons which shall conform in all respects to the rules and re-

quirements of the Commission." The State Hospital Commission is firmly of the opinion that places designed for the care of the insane pending commitment should, in all instances where such an arrangement is possible, be provided for in some building other than a jail.

When an order for commitment has been made the health officer shall see that such insane person is, without unnecessary delay, transferred to the institution to which he has been committed. Before his removal to the hospital such officer shall see that the patient is in a state of bodily cleanliness and comfortably clothed with suitable or new clothing, in accordance with the regulations prescribed by the Commission. These regulations require that the patient must be provided with one full set of underclothing and one full set of outer clothing, including headwear and boots or shoes. Between the last day of October and the last day of March there shall be furnished in addition to the foregoing, a suitable overcoat for men patients and a shawl or cloak for women patients, also gloves or mittens. This clothing must in all cases be new or such as will be accepted as suitable by the superintendent of the State hospital to which the patient has been committed.

Each patient shall be sent to the State hospital within the State hospital district embracing the county from which he is committed, unless otherwise authorized and ordered by the State Hospital Commission, or to a private licensed hospital for the insane, or to the Middletown or Gowanda State Homeopathic Hospitals from any of the counties of the State in the discretion of the judge granting the order of commitment. The hospital to which the patient has been committed will, upon notification and presentation of the commitment papers, send a trained attendant for the patient.

RESPONSIBILITY FOR THE CARE OF INSANE WHO ARE NOT POOR AND INDIGENT

When an insane person is possessed of sufficient property to maintain himself, or his father, mother, husband, wife, or children are of sufficient ability to maintain him, and his insanity is such as to endanger his own person or the person and property of others, the committee of his person and estate, or such father,

mother, husband, wife or children must provide a suitable place for his confinement and there maintain him in such a manner as shall be approved by the health officer of the town, village or city wherein he is confined and in accordance with the rules of the commission. The health officer is required to see that the provisions of this section are carried into effect. If the persons responsible, as specified above, refuse or neglect to care for an insane person, it shall be the duty of the health officer to apply, or cause application to be made, to the judge of a court of record of the city or county, or justice of the supreme court of the district in which said insane person resides or may be, for an order for his commitment to an institution. Pending such transfer, the health officer should see that such insane person is cared for in a suitable place and is provided with proper medical care and nursing. Patients other than poor and indigent insane may be admitted to a State hospital by authority of the State Hospital Commission, provided they are residents of the State and provided that they shall pay for their maintenance at a rate fixed by the Commission, which payment shall be secured by a surety company bond.

The cost incurred in determining the question of insanity, including the fees allowed by the judge or justice ordering the commitment, and in securing the commitment to a hospital, and the expense of providing clothing and proper care and medicine, shall be a charge upon the town, city or county securing the commitment. The compensation or fees and expenses of health officers for duties performed in respect to the examination, commitment, care and treatment of insane or alleged insane persons *shall in each case be determined by the judge or justice ordering the commitment,* and shall be a charge upon the town, city or county in which said person resides or may be. (Sec. 84, Insanity Law, page 74.) Such judge shall issue a certificate stating the amount thereof, to whom to be paid, and whether a charge on the county or a town, which shall be given to the county treasurer and be paid by him out of any means available for such purpose. If the compensation, fees or expenses of the health officer so determined are allowed or are charged upon a city, they shall be paid in the same manner as the other expenses of the health department or bureau in such city.

PROCEEDINGS NECESSARY FOR THE
PERSO

Attention is called to the fact tha used for many years for the commi tions for the insane have been chang State Hospital Commission and only *used for that purpose.*

The amendment to the Insanity Law for commitment must be made by a pers insane person may reside or at whose father or mother, husband or wife, brot any such person, or the next of kin ava of such person, or an officer of any well-r stitution or home, or any overseer of the superintendent of the poor of the county, son may be. *No other persons are autho the petition for commitment.*

Notice of an application for commitment sonally, at least one day before making su the person alleged to be insane, and if mad superintendent of the poor, also upon the husl or mother or next of kin of such alleged ins be any such known to be residing within the upon the person with whom such alleged insa side, or at whose house he may be. The ju application is to be made may dispense with suc or may direct substituted service to be made upo be designated by him." An affidavit of persona be made, must be presented with the commitme superintendent of the hospital to which the patien

Attention is called to the fact that the law r examination within ten days next before the granti of commitment, by two legally qualified examin Medical examiners must have on file in the office Hospital Commission at Albany a certified copy of of their appointment by a judge of a court of rec that they possess the required qualifications. The ori

cate of appointment must be filed with the clerk of the county in which the examiner resides. Not only must the medical examiners certify to the fact that the person examined is insane, but they must also certify that he is a proper subject for custody and treatment in an institution for the insane.

No person can be committed to a civil hospital for the insane who is held under a criminal charge at the time of his commitment. (See Sec. 836, Code of Criminal Procedure, as amended by chapter 557, Laws of 1910; also Sec. 80, Insanity Law.) Before commitment the judge must discharge the patient from imprisonment. No idiot, imbecile, epileptic or dotard, not insane (Sec. 80, Insanity Law, page 69), or person suffering from alcoholism or drug addictions, not insane, can be committed to an institution for the insane, nor will any patient be admitted to a state hospital *if, in the opinion of the medical superintendent, he is not a proper case for treatment within the meaning of the statute* (Sec. 82, Insanity Law, page 71), and such person, if refused admission, shall be received and cared for by the superintendent of the poor or other authority having similar powers in the county from which he was committed. (Sec. 94, Insanity Law, page 83.)

EMERGENCY COMMITMENTS

In cases where the condition of an insane person is such that it would be for his benefit to receive immediate care and treatment, or when he is dangerously insane, so as to render it necessary for the public safety for him to be immediately confined, he may be received into an institution authorized by law to care for the insane on an emergency commitment, the petition having been presented in accordance with the requirements of the law, together with a certificate executed in the customary manner by two qualified medical examiners. When emergency commitments are made, the papers should be prepared in duplicate, one copy being presented to the superintendent of the hospital to which the patient is taken and the other to the judge of a court of record for an order of commitment. It is the duty of the health officer or other public official responsible for the patient's admission to see that the order of commitment is obtained and delivered to the superintendent or physician in charge of the hospital to which the patient has been admitted within ten days as required by law.

Every health officer should thoroughly familiarize himself with the provisions of the Insanity Law regarding the care of the insane pending commitment, as the responsibility for this care devolves primarily upon him. Any questions which are not thoroughly understood may be referred to the State Hospital Commission and an opinion will be obtained, if necessary, from the Attorney-General. The Commission will also furnish printed instructions regarding the duties of health officers and other officials relating to the care of the insane and will provide medical examiners with information which will materially assist them in the preparation of certificates of lunacy.

THE CHAIRMAN — In the City of Syracuse they have attempted to carry out the provisions of this law. They have a psychopathic hospital and contagious diseases hospital which you are invited to visit. They are in charge of health officer D. M. Totman; and I have pleasure in calling on him to say a few words about the matter.

DISCUSSION

DR. D. M. TOTMAN (Syracuse)— The city of Syracuse is placed in a position somewhat different from other cities of the second class. We are in a district of the State where we are pretty nearly the tail end of it. We have to send the insane from Syracuse to the St. Lawrence State Hospital at Ogdensburg, 138 miles from Syracuse, which in facilities for transportation is equal to the distance of New York City or the city of Cleveland. Before this law which has been spoken of, which went into effect on the first of October, 1910, the health officer had to provide for the care of these unfortunate people.

We had at our disposal at that time two rooms in a building known as the Municipal Lodging House, which was the headquarters for taking care of tramps; and there were two wire cages there, one for the women and the other for the men. We immediately took steps to get better quarters, and we had options on something like six or eight different houses in the city. As soon as the neighbors learned of those options there was a protest raised which was listened to by the authorities, and we finally were compelled in a few months to establish a psychopathic hospital where we could oversee the nursing, maintenance and care. Since that time, October, 1910, we have a record of 408 cases cared for. They were all insane. During the year from December 1, 1911, to December 1, 1912, we had 224 cases on our records. Of these, 111 only were sent to the State Hospital.

I will pass rapidly now to some questions I would like to present to you. I noticed that in the discussion yesterday it was

suggested that the care of the insane be provided for in the general hospitals. I will not go into that at length, but we found we must have a specially trained nurse for the care of the insane; so we finally got from the St. Lawrence State Hospital a capable trained nurse, and in no single case have we had to employ restraint, even to the extent of a cotton thread. That is a true statement, and it is true because we have had experienced people; and you cannot care for the insane without such trained persons. I am sorry to say that after thirty-five years' experience in a general hospital I have seen more restraint employed by internes and visiting physicians and surgeons than I ever hope to hear of again. You cannot have these insane people cared for by the internes of a hospital and the ordinary nurses. You must have expert work.

I am pleased to say that recently I received a communication from the State Hospital Commission that we may send to Utica such papers as requested. We make a careful study of our cases. I would like to tell you how carefully we go into the study of our cases, but we have not time here. We make a diagnosis which is tentative, and from the St. Lawrence Hospital they send us back their history of the case and their diagnosis of the case, and so we get that information and instruction.

The interesting part of the work is along a line I am sure you will be interested in, and that is that we are instructing our medical students in the care and observation of these cases in their early history. The medical students who have graduated previous to 1910 from our Syracuse Medical College never saw a case in the whole course of their medical study, unless it was by accident. Now, every student is compelled to take thorough and complete observation of the cases which we have. That is one side of this subject of the care and control of insane persons. What can you do unless the physicians at least have the essential foundation principles for the observation and study of the insane; and these incipient cases are the cases to study, aided by that fuller history which is given back to us by the St. Lawrence State Hospital.

THE CHAIRMAN — If any of you gentlemen have questions to put to Dr. May I am sure Dr. May will be glad to answer them.

DR. CONLEY — We health officers have been getting our ideas of this Insanity Law from our city attorneys, and every city attorney interprets the law differently. Dr. Totman said that in Syracuse he was at the tail end of a district. At both Hornell and Corning we have to send our patients clear to Waverly, and then change to go to Willard. Formerly I used to telephone to

Willard, and I would go there and then come back the next morning and get back to Willard at 4:30 or 5 o'clock. They refused to send attendants, and it makes a great deal of extra expense on the city.

The health officer is supposed to take care of the insane, but there is a great difficulty about the question of extra compensation for fees as an examiner. I had an experience the other day of a patient sent to the Hornell Hospital, with some symptoms of insanity. He was sent there by his private physician; it was an indigent case and it should have been reported to the health officer. The case was reported as insane, and they said at the hospital, that if sent in there, they would examine him. The case was sent in, and the next morning at 5 o'clock the patient walked out and broke his back.

Then there is another point: Our judge says that even if the patient is from the county, even the next county, and comes to the city and becomes insane, you have to take charge of the case, and it is a charge against the city where she is.

DR. PERCY G. LOCK — I would like to say a word or two in regard to our experience. I am the physician in charge of the Syracuse Psychopathic Hospital, and it is possible I shall get ahead of this day and this generation; but I feel confident things will work out approximately along certain lines in the matter of the possibilities of giving sufficient and proper care to individuals alleged to be insane, or who may or may not be insane, for that is a very serious question for you, outside of the cases of those who are obviously insane. The law provides that you shall give them proper care and attention, as to their welfare, etc.; but the town board does not provide any means for carrying out that part of the law which is mandatory; and you all know that in your towns and villages, the larger percentage of the cases I see are in the lockup. They have a place for the fire engine, with a place upstairs for holding a town meeting, and downstairs they have a strongroom with iron bars with a hose wagon and various booths stacked up there; and the insane individual is placed in there, and the constable is requested to go and see him once in a while.

The result is that throughout the county there is a pretty constant cry coming in, nearly every day, about as follows: "Doctor, I am in trouble. You've got to help me. I can't help this man. The town won't pay the bill." If you help in that case, you do that two or three times and after that you won't obligate yourself for the service.

It does not seem wise for individual towns in the county to

attempt to care for these people, pending a determination of whether or not they are insane, which may be a matter of ten days. And furthermore that period of ten days may be extended; you cannot many times determine it in ten days. I saw a man fifteen years ago, and I do not know whether he is insane at the present time or not. I believe that each county should select some central location — the larger town in the county; or in sparsely settled counties, two or three adjoining counties can pool their issues so that in two or three hours' journey the central location can be reached. There a psychopathic hospital can be built; it would cost $10,000 to start with, and it costs $5,000 to run it now, in the case of our hospital. A small appropriation on the part of the board of supervisors of the different towns would be sufficient to reconstruct an old building; and they could pay a matter of $1 a day for each patient. I feel that must come. The scattered units are too clumsy to handle.

The next point is in regard to the utilization of the general hospitals for the temporary care of the insane. That was my original idea, but that is impossible. It can be done if it is as at Bellevue Hospital, under the supervision of a trained alienist; then it can be a part of the general hospital. But otherwise the nurse and physician cannot know or give the care these people should receive.

Sooner or later we must establish these central places under the authority of the counties and the supervisors, to which these patients may be referred for a decent and proper observation of their cases; and not railroad them as they are into the hospitals which are two or three days' journey away, and which are an unnecessary charge against the State. Then, each of these psychopathic institutions should be under the supervision of the State Hospital Commission; it already has its visitorial powers to visit them; it can recommend also; but it should have mandatory powers over the municipality and the supervisors of the town boards for prompt observation and care of individuals of that kind.

DR. TOTMAN — The speaker has said that the health officer may examine the cases, and that the way looks clear for him to get his pay. But has he read that law? If he reads that law he will see that the health officer must receive his pay according to the methods of paying that health officer in that city. Now I would like to know how those two things are reconciled. The health officer of this city is paid a salary which goes into an annual budget. That is fixed to a cent, and the charter of the city expressly stipulates that he shall not receive an additional

cent beyond his salary for his work a
received one penny for the very nume
in this city, and I do not see any way

DR. BARRETT — One year ago there
into our town and he was taken in b
they called on me to attend and care
mitted. I did what was right: As he
two men to care for the man, and we g
committed. That was one year ago la
county judge about my compensation, a
issued the papers of commitment inform
the law unconstitutional. That is the
taking care of insane patients.

DR. HALLENBECK (Canandaigua) — My
Sanitary Officers' Association yesterday de
Law as it applied to the health officer. Mo
towns have not two hundred or three hundre
In Canandaigua we have four or five such
year. We cannot afford to have a nurse all
two hospitals, one of them will not receive s
hospital is chartered under the State Charities
is a private hospital, and they will take the
their time, and, with extra compensation, we ha
taken care of.

As regards getting the pay from the villages
law says the judge or the justice issuing the or
whom this shall be paid. In our county, Judge
the order, and it is O. K.'d at once, and I writ
treasurer and I get my pay.

DR. CLARK — Oneida county is under the State
Law where the Comptroller audits the bill, and y
insane person committed, but the Comptroller will
an order. He says it must go through the board o
and through the county comptroller, and then yo
county treasurer; and he refuses to pay the bill.
mine in the northern part of the county had a good
penses for committing a person, and he got a cut.
plain enough as to compensation!

DR. HERMANCE (Clarkson, Monroe county) — I find
the health officers here — the gentleman who last spoke
eral others — have had experiences similar to my ow
county judge takes the position that the law is unconsti
and so he will not act. They send us back to our supe

and you take the bill to the supervisors and they will not pay. You go to the board of supervisors and they say: We don't know anything about this. Then you go to the town board with it. The law is very specific on this matter, but still the men who take care of these patients are still unpaid.

Another thing, situated as I am, within twenty miles of the state hospital, it does not take our men long to get them there. A judge, when the papers are sent to him, sometimes sends the papers back and says: You have not made it clear that it is an emergency case. Then it may be the following Monday before we can get that fixed up and brought before the judge in the court again. I wonder if the state hospitals could have on their staff of attendants people that could be called on to come to us to take care of these people. You can all imagine how difficult it is in a farming community to go to a farmer and ask him to take care of a crazy man. The average farmer would drive you off his place with a pitch fork. I have wondered whether it is not possible for the state hospitals to arrange to send people, attendants, for one, two or three days in these cases and we pay them for the time?

THE CHAIRMAN — We will ask Dr. May to close the discussion.

DR. MAY — You asked some questions that I am afraid the Attorney-General cannot answer. But they all pertain to matters which are of great importance, and so something should be done about the difficulties which have been spoken of. The law is specific enough about the way in which these expenses are to be met. The compensation or the fee and expenses of health officers for duties as required by this act was in each case to be determined by the judge on hearing and application, and was to be a charge on the city, town or county in which the said person or persons resided or may be.

In another section which I read a little while ago, it specifically states that the county treasurer is to make these payments. If the county official refuses to perform his duties, what are you to do? The Attorney-General has ruled that such an action constitutes a misdemeanor, and you have the same redress there as you have in the case of any other public official refusing to perform his duties. I would not suggest your taking such action, however, but even if this is unconstitutional there should be some right way to collect these fees and expenses. It seems to me that county officials should be willing to co-operate in these matters so as to save all this time and trouble by paying these small bills. I would be glad to receive communications from any of you, making any suggestions which you think would clear up

this difficulty so as to have your bills audited and paid. If there is some quick way to do it, we might have the law amended and make other provisions for these payments. If that cannot be done we must fight it out in the courts.

I am glad Dr. Totman has received a notice that his county has been added to the Utica State Hospital district so that it will not be necessary to send patients 138 miles to the St. Lawrence State Hospital. The commission has realized that this was a hardship which should not be imposed on residents of Syracuse and Onondaga county.

The insane cannot be taken care of in the wards of a general hospital. They can be taken care of in psychopathic wards connected with general hospitals. This is not a theory, but it is a fact: Six thousand a year are committed from the psychopathic ward in Bellevue Hospital, so there is no question about it being done. It has been done also from Pavilion F of the Albany Hospital; and there is no question about the desirability of psychopathic wards connected with general hospitals. I think we shall sometime soon have psychopathic hospitals in some of our larger cities. We are now a long way from that, however.

I think the suggestion that the counties adjoining one another should name some place where they can co-operate and take care of such persons is a good one; I think they should arrange for some central location and divide the expense in some way suitable to themselves.

The question of the pay for care of these persons pending commitment is an important one. The law says that their care shall be a charge on the city, town or county in which such persons reside or may be. Then it later refers to the municipality, county or other authorities obtaining a commitment which is a charge on those localities. Whether or not that is absolutely fair or proper, is not the question for me to decide.

The law says that the commitment papers shall be presented to the hospital after the order has been signed by the judge. I do not remember the wording of that, I read it in the papers and it is a little bit indefinite. I do not think the superintendent of a hospital would have an absolute right to refuse to send an attendant until the papers had been presented to him or received at the hospital. If he does, he will waste a lot of money in sending attendants to a patient who could not be brought to a hospital, or who would die before they got him there. So it has been customary for the superintendents to ask for a paper, and the law provides that the superintendent may refuse a case that is not within the statute. It is much easier to refuse entrance to a patient, than it is to get rid of him after he is admitted im-

properly. I think it may be looked upon as within the province of the superintendent, owing to the fact that he must pass on the suitability of the cases for admission.

The question of ten days' observation in these cases is of considerable importance, of course. Ten days' observation has been sufficient, or at least they have gotten along some way under it in the wards of Bellevue for a great many years. There are many cases that really do require more than ten days' observation, and I am inclined to think that it would be wise to extend that time by amendment.

One gentleman spoke of the possibility of sending attendants from the hospital to look after insane persons pending commitment. I appreciate the fact that it is difficult to get persons who are fit to take care of these people before they are taken to the State's Hospital. It is an unfortunate fact, however, that the expenses of operating the institutions are so great, that there are no funds available for such a purpose. It is true, I think, in many instances, you can find former employes of state institutions who would be glad of the opportunity to make some money in such ways. That would be one way of getting around that difficulty. You might not be able always to find such persons, but by writing to the superintendent of the State Hospital he might be able to suggest three or four persons in your neighborhood who could take care of such persons pending commitment.

We shall be glad at all times to get opinions from the Attorney-General in cases where there is some difficulty in the interpretation of the law. The law is indefinite and obscure in some cases. I wish the health officers would communicate with us and make suggestions, and we should be glad to take these matters into consideration and introduce any legislation which might correct the situation.

THE CHAIRMAN — It is my pleasant duty to thank you on behalf of the State Department of Health, and particularly on behalf of the Department of Publicity and Education, for your attendance here at this Conference and for your hearty support of the chair.

Conference adjourned.

Public Address: Monday, December 2

INDUSTRIAL DISEASES AND THEIR PREVENTION

BY JOHN WILLIAMS

New York State Commissioner of Labor

One of the distinguishing features of this day and generation is the marvelous quickening of social consciousness, of serious interest in the welfare of the human family, and more particularly the welfare of the least fortunate members of that family.

In this awakening we are coming to a clearer and fuller realization of the social value of individual efficiency. Every man and woman is expected to fill a place in our social structure. It is a matter of supreme importance that each person should arise to the highest attainable degree of development, in order that the service rendered by such person, of whatever nature it may be, shall be the best, the most efficient, and be sustained to the full during the natural period of life's activity.

Impaired physical health and powers serve to reduce efficiency, and ultimately to cause the afflicted individual to become a social burden.

The serious import of such a condition is admitted; therefore, inquiry into the causes that lead to the impairment of health is a duty which must be undertaken. In this connection, we are privileged to avail ourselves of the investigations conducted in other countries, to point out to us the direction we should take.

That modern industrial processes are responsible for various forms of disease has been recognized for many years. The increasing number of persons engaged in identical occupations who were under medical treatment and manifesting the same symptoms, led to inquiry as to the causes, and it was found that such persons had contracted disease by contact with or absorption of certain poisonous substances used in the processes of manufacture in which they were engaged.

In England, all practicing physicians are required to report to the factory inspector all cases brought under their observation, the symptoms of which lead them to suspect that the patients are suffering from industrial lead, phosphorous, mercurial, or arsen-

ical poisoning or anthrax. Such reports enable the officials to take account of the industries and conditions that apparently cause these illnesses, and further, to take steps to eliminate those conditions.

In 1911 the Legislature of the State of New York, upon the initiative of the American Association for Labor Legislation, enacted a law requiring every practicing physician in the state to report to the Commissioner of Labor every person upon whom he is called to visit or attend, whom he believes to be suffering from poisoning from lead, phosphorous, arsenic or mercury or their compounds, from anthrax, or from compressed air illness (commonly called "bends"), contracted as the result of the nature of the patient's employment.

It is unnecessary to point out the reason for such a law. The State at last awoke to a realization of its obligation to its citizens. Men engaged in its industrial establishments were falling victims to insidious attacks, culminating in total physical disability, and often in death. So, in order to lay a foundation for such preventive and remedial measures as might prove necessary, it was decided to find out definitely the extent, nature and location of the seat of trouble. This could be accomplished only by securing exact information from those qualified to furnish it.

This law has been in effect for a little more than a year, and we are beginning to find out what employments are surrounded by dangers that are almost invisible but none the less terribly real and a menace to the persons engaged in such employments.

The information that comes into our possession enables us to call direct attention to conditions in factories which threaten the health of workers. We know that persons who work in connection with the manufacture of lead, or who use lead in the course of their employment, are liable to be attacked by a disease called "plumbism" or lead poisoning. We also know that when mercury or arsenic is used, there is danger to the operative. Therefore, under a recent law we require that certain precautions be taken to minimize the dangers. We require that hot and cold water service and individual towels be provided for the use of such factory workers. We also prohibit the taking of food into any room where any such poisonous substances are used in the course

of manufacture. These are important steps in the elimination of the dangers, and faithful, rigid compliance therewith spells prevention.

But in the detection of the dangers of industrial poisoning and disease and in the application of preventive measures, there must be intense, earnest and serious co-operation between the medical men of the state and the Department of Labor in the first place, and in the second place, and most important of all, there must be the heartiest response on the part of employers and workmen to the suggestions and orders which may issue in regard to the dangers I have referred to.

There should be no misunderstanding as to the kind of labor or industry where the dangers of poisoning are greatest. Lead poisoning leads the list. Out of a total of 164 cases reported to the Department of Labor from October 1, 1911, to September 30, 1912, 127 were recorded as lead poisoning, and of that number, 74 of those affected were engaged in the painting and finishing trades; 51 were house painters, the remainder being scattered among the employes of various manufacturing business — all, however, using lead in the course of their work.

So startling are the facts in regard to the dangers of the painting and finishing trades, that we have decided to print and circulate a special caution card for the benefit of men working at those trades and for those in the other industries where lead is used. On this card will be printed minute advice as to personal hygiene, which is one of the most important factors in our preventive campaign.

Let me give you a few excerpts from our card:

"Lead poisoning is one of the most common of the diseases of occupation. In order to prevent this disease — and it can be prevented easily — the Department of Labor must be informed as to the number of cases which occur throughout the state; and in what kind of work lead poisoning is actually taking place.

"Lead poisoning is preventable partly by the proper ventilation of factories and shops. Hoods and other mechanical means to take away lead dust and fumes are necessary. Respirators for workers exposed to lead dust are very useful and should always be used.

"But to a large extent lead poisoning may be prevented by the workmen themselves. *Lead is poison to the body.* Those who

work with lead must themselves use the greatest care. Among white lead workers and others exposed to lead, the care which the workers take of themselves is of the *first* importance.

"Lead enters the body mainly through the nose and mouth. It may be inhaled as dust or in fumes. It may be swallowed with food or saliva (especially if tobacco or gum is put into the mouth with soiled fingers), or it may sometimes be absorbed through the skin.

"Lead acts upon the body slowly and insidiously. Without knowing your danger, you may be getting some lead poison into your body every day. If you are working with lead in any one of its many forms, you must therefore use great care so as to protect yourself against it.

"On the very first sign of not feeling well, see a doctor or go to a dispensary. *Be sure to tell the doctor all about your occupation, and its dangers.*"

How to Prevent Lead Poisoning

"Always wash before eating and before leaving the factory. Remove all dirt from under your finger nails with a brush.

"Never eat in the room in which you work.

"Never chew tobacco or gum while working. If you do, the lead dust on your fingers and in the air is sure to be swallowed.

"Use overalls when you work. Do not wear your working clothes on the street or at home. They contain lead, and poison you and others.

"Keep the workroom clean. Do all you can to keep down dust. Do not get lead on your clothes or hands any more than you can possibly help.

"Always eat a good breakfast before going to work. Drink plenty of milk. Beware of constipation — it is a suggestive symptom of lead poisoning. Avoid the use of intoxicants in any form. Their use weakens the body and makes it harder for your body to overcome the poison of lead.

"Keep clean. Wash with warm water, soap and nail brush. Take at least one full hot bath a week."

These suggestions are not the fanciful or capricious utterances of uninformed men. They are the result of the deliberations of some of the leading medical men and others in Greater New York upon whom we called for counsel. It is our purpose to put into the hands of every worker with lead in the state, a copy of our caution card. By this means we hope to reduce the number who fall victims to this insidious industrial danger. Our success depends upon our ability to interest each man in his own welfare.

Opportunities like the present cannot be too highly commended and appreciated. We are enabled to bring to the attention of the people, and particularly the workers, the peculiar dangers that beset them, by reason of our industrial development, and the methods to be employed to escape such dangers; and as the subject of industrial disease is more thoroughly understood, there will be fuller co-operation and co-ordination of effort, both official and unofficial, to stamp out the inexcusable and unnecessary dangers of industry.

Our Department is also interested in accident prevention. But accident prevention and the elimination of the dangers of industrial diseases are entirely different propositions.

Accidents are unexpected happenings, a certain per cent of which may be prevented by observing conditions and noting probable dangers and taking steps to avoid them. Not all are preventable, no matter how thorough may be the inspection or supervision of the works.

Industrial disease, on the contrary, is certain to develop if proper precautions are not followed; while, on the other hand, if care is exercised and efficient means are adopted to prevent the absorption of poisonous substances, the danger can be entirely eliminated.

Medical men, employers and workmen must co-operate with the state authorities to wipe out all industrial dangers.

Public Address: Tuesday December 3

HEREDITY AND EUGENICS IN RELATION TO PUBLIC HEALTH

By PROF. CHAS. W. HARGITT

Syracuse University

It is difficult to conceive of a higher expression of progressive civilization than occasions like this, except as such conferences and congresses take on international relations, such as the recent International Congress of Hygiene and Demography. This is but another response to that call to *public health*, which has been so emphatic within the past decade or two. This call may find its motif in one or more of several aims. For example, it may find expression in some single, great demand, like the anti-tuberculosis crusade, or campaigns for pure food, or pure water supply. Again, it may see the larger vision of national or racial betterment, to promote which must involve a campaign of age-long duration, and the application of the fullest measure of scientific knowledge for its realization. But this is a State Conference of Sanitary Officers, and its chief concern must therefore center in those problems which concern primarily the citizenship of this commonwealth. Yet in this as in other respects, "no man liveth unto himself." Surely, it is not too much therefore, that in a program covering the week some attention be directed to problems of race-betterment, broad problems of biology, no less than to those specific problems just referred to. If then *eugenics* may challenge consideration as an appeal, not simply for conservation of natural resources; not alone for capacity for efficiency and economy in developing the all but fabulous resources of a great continent so that posterity be not robbed; not in a militant propagandism in world colonization, whatever the motive; but rather, for development of imperial ideals and aims in that wealth which alone makes for true national greatness, — its wealth of life, it ought not to be devoid of interest and value. Life was cheap when such monuments as pyramids are the only token of greatness. May such folly be far from future imitation! But to place an emphasis upon the infinite worth

of life, not simply in its physical expressions, though in the language of Spencer "to be a superb animal is the first requisite in development of superior manhood," but in a sound body as conditioning and fostering sanity of mind and thought, and most of all those ethical and spiritual ideals of truth, fraternity, equity, altruism; a law-abiding, God-serving nation, with a mission of helpfulness to every nation of the globe, should be a primary aim of the Conference.

The following appeal is both eloquent and pathetic:

"Forced inside a motor-omnibus one evening, for lack of room outside, I found myself opposite a woman, poorly clad, with a wedding ring upon her finger and a baby in her arms. The child was covered with a black shawl and its face could not be seen; it was evidently asleep. It should have been in its cot before this hour. * * * Here was the spectacle of mother and child, which all the great historic religions, from Buddhism to Christianity, have rightly worshipped; the spectacle which more nearly symbolizes the sublime than any other upon which the eye of man, himself once a child, can rest; the spectacle which alone epitomizes the life of mankind and the unalterable conditions of all human life and all human societies.

"This woman, utterly unconscious of the dignity of her attitude and the contrast between herself and the imitation of a woman, elegantly clothed, who sat next to her, though giving her not a glance nor a thought, * * * was probably some thirty-two or three years old, as time is measured by revolutions of the earth. Measured by some more relevant gauge, she was evidently aged, her face gray and drawn, desperately tired, yet placid — not with due exultation but with the calm of one who has no hope. She was too weary to draw the baby to her bosom, and her arms lay upon her knees; but instead she bent her body downwards to her child. She looked out directly in front of her, not at me nor at the passing phantasms beyond, but — at *nothing*. Her face had no beauty of feature nor of color nor of intelligence, but it was wholly beautiful, made so by motherhood. The tint of her skin and of her eyeballs spoke of impoverishment of blood, her need of rest and ease of mind.

"She will probably die of consumption within five years and will certainly never hold a grand-child in her arms.

"The pathologist may lay this crime at the door of the tubercle bacillus; but a prophet would lay it at the reader's door and mine. While we read and write and play at politics or ping-pong, this woman and myriads like her are doing the essential work of the

world. The worm waits for us as well as for her and them; and in a few years her children and theirs will be MANKIND. We need a prophet to cry aloud and spare not; to tell us that if this is the fate of mothers in the ranks which supply the overwhelming proportion of our children, our nation may number Shakspeare and Newton among the glories of its past, and the lands of ancient empires among its present possession, but it can have no future; that if, worshipping what it may call success, it has no tears nor even eyes for such failures as these, it may walk in the ways of its insensible heart and in the sight of its blind eyes; yet it is walking not in its sleep but in its death, it is already doomed and damned almost beyond recall; and that if it is to be saved, there will avail not the broadening of taxation, nor teaching in *churches* the worship of the Holy Mother and Holy Child, while motherhood is blasphemed at their very doors,— the establishment, not in statutes but in the consciences of men and women, * * * of the perdurable dogmas that all human life is holy, all mothers and children, that history is made in the nursery, that the race or society which succeeds with its mammoth ships and its manufactures but fails to produce men and women is on the brink of irretrievable doom; that the body of man is an animal, endowed with the animal instincts necessary for self-preservation and propagation, but that in the possession of a conscious spirit, it demands that, the blind animal instincts notwithstanding, the desecration of motherhood, the perennial slaughter and injury of children, the unconsidered birth of children for whom there is no room or light or air or food, and of children whose inheritance condemns them to misery, or crime must cease; and that the recurrent drama of human love and struggle reaches its happy ending not when protagonists are married, but when they join hands over a little child that promises to be a worthy heir of all the ages. This religion must teach that the spectacle of a prematurely aged and weary and hopeless mother is an affront to all honest and thoughtful eyes; that where there are no mothers, such as mothers should be, the people will assuredly perish, though everything they touch should turn to gold. I believe that history, rightly read, teaches these tremendous lessons." (Saleeby, Race Culture, p. 6.)

The active growth and extension of ideals and efforts toward social betterment within the past twenty years is an index of a healthy state of sentiment, and should have the largest respect, whatever may be our attitude toward the methods which may be called into requisition toward the ends sought.

Perhaps it hardly need be stated th
tinct methods of approach, and two
modes of attack upon the problems co
be designated as the euthenic, — the
environment, etc., the other *the eugenic,*
of heredity, etc. It need hardly be em
been the dominant ideal *of both social*
examples may be cited the enormous
measures, social *settlements,* church cl
guilds, etc. That all these *make for bett*
can hardly be doubted. Whether these l
such as to affect the fundamental *condition*
and race progress has been of late *seriously*
tific assumptions, and by *experiments* which
not to be lightly discounted.

"We are rapidly diminishing those *selectiv*
the past have developed *race vigor.* * * *
ervation of the sickly has had the *effect of i*
period of the average *child.* * * * *Sanit*
and surroundings, as we have seen, are *taken ad*
by the sickly; and thus *with our increased prob*
have diminished the average robustness *of consti*
healthiness of the race, for *a larger proportion o*
living among us." (Haycraft, Darwinism *and*
p. 60.)

On the other hand it was earlier *pointed out b*
(Sociology, p. 336), that:

"As fast as more and *more detrimental* agencies
or decreased, and as fast as there results *an increa*
and propagation of those *having delicately balanced*
there arise additional destructive agencies. *Let the a*
ity be diminished by more *effectively guarding the w*
adverse conditions, and inevitably there *come fresh di*
illustration I need but refer *to the many diseases f*
civilized races suffer, but which are unknown *to the u*
Every further appliance for *meeting an evil, every add*
penditure of labor, every new tax to meet such, *become*
obstacle to the living."

It seems to me that there are *undoubted elements of*
both the views so strongly presented by these writers.

more, they do not seem to me to be essentially contradictory. The contention of Haycraft that diminishing selective agencies have a menace for the permanent progress of racial worth is almost certain. And so of the contention of Spencer, that artificial aids to promote health invite unforeseen, but certain perils as a consequence, must also compel pause among serious students of sociology. * * *

To my thought all three views are important, and probably complementary. And yet, this does not imply that these alone are all the factors which are involved in our problem. The resulting selection need not necessarily be one of fundamental betterment. It may be, in the words of the ritual, "for better for worse!" Selection has only taken a new direction. It may be bad as well as good. For example, let us glance at a few actual conditions. Facts available from all sections of the world make it very sure that certain of our social components are not progressive, or indicative of racial virility and strength. The facts of increasing criminality, feeble-mindedness, insanity, etc., suffice to illustrate. From our last census we are confronted with these figures: * Insane and feeble-minded, 250,000; blind, 100,000; deaf and dumb, 100,000; paupers, 80,000; criminals (in prison), 100,000; juvenile delinquents in reformatories, hospitals, etc., about 2,000,000.

In round numbers, note the fact, that in this "land of the free and home of the brave" we have a population of about 3,000,000, of not only non-productive, but a "white man's burden" of annual taxation of $100,000,000.

Let us glance nearer home. In the Empire State we had in 1889 in state asylums 15,473; in 1911, 33,311. These for insane alone. The increase of the state population from 1890 to 1911 was 52 per cent. The increase of state insane for same period was 104 per cent.

Exact data as to other classes of defective and antisocial types are not at hand for current year; but the above will emphasize quite strongly the contention made concerning degeneracy.

Great Britain reveals a similar state of social drift. In 1901, of 60,000 idiots and imbeciles, 20,000 were married; and of

* Approximately.

117,000 lunatics, 47,000 were married. That is, of these two classes of unfit, 65,000 were authoi "multiply and replenish the earth" with an inci of unfitness.

STATE OF THE CASE 1. A large and constar body of socially unfit.

2. The burden of taxation for their care, both i attendants, increased in corresponding ratio.

3. The natural propagation of these classes is not but in some cases encouraged and legalized.

4. Rate of propagation of these classes of unfitn higher than among the desirable and fit. The ave of children among degenerates, feeble-minded, etc., plus, while among the socially and physically fit only 3.

This means that about one-eighth or less of this and those chiefly unfit, will produce about half of the r one cannot contemplate with equanimity the probl coming generation, and of the future nation, withou serious and ominous misgivings. As Pearson has for pressed it, "We cannot recruit the nation from its infe without deteriorating our national character."

5. Remedial measures? What can be done about it? the crucial questions. That we cannot adopt the *lessez f* tude is more and more evident. Heroic treatment is in We are at the threshold of eugenics, — the appeal to nat

HEREDITY In its general import it may be taken for that every one is more or less familiar with the idea of l As long ago as when the astute Jacob took advantage knowledge that certain streaks and spots of cattle were h to beat his overexacting father-in-law in a herdsman's con another of this ancient time used the phrase "the fathe eaten sour grapes and the children's teeth are set on edg have not been without some understanding of what h means, and that is something very real. On the other hand, as we know, about the earliest attempt to definitely form rational explanation of heredity in terms of science within about fifty years, and involves the well known nar

Herbert Spencer and Charles Darwin, and their hypotheses of Physiological Units (1863), and Pangenesis (1868). From this time on till about the close of the century, various subsidiary hypotheses were propounded, notable among them being those of Galton, Nägeli, Brooks, Weismann, and DeVries.

Contemporary with Spencer and Darwin an obscure monk, Gregor Mendel, was busy experimenting in his cloister garden on hybridizing common peas, some of whose results were published in 1865, but in so obscure a journal that not till 1900 did they come to be known and appreciated.

In order to apprehend clearly the mechanism of heredity one must clearly grasp the fact that the individual is a product compounded from a double ancestry. He may have the hair color of the father and the eye color of the mother; the fair skin of the mother and the keen mind of the father, etc. Yet this is true only in a very general way. These qualities may, indeed, have belonged to the one or the other parent distinctively, yet in fact they are fundamentally the properties of the germ-cells of the parent stock. Now it was Mendel who analyzed the constitution of the gametes and showed the factors to be bearers of certain characters, later distinguished as unit characters, and that these might combine to produce their appropriate results, or that they might remain quiescent in part, and that finally they might and did segregate in a subsequent generation. Where one such character asserted itself over another it was designated as dominant, and the one submerged or latent came to be known as recessive. Moreover, Mendel was able to show that all such unit characters asserted themselves in subsequent generations in a certain fairly constant ratio in the hybrid progeny, namely, the so-called Mendelian ratio of 3:1. For the first time it became practicable to forecast and control heredity along definite lines.

While it is yet too early to venture any dogmatic pronouncement as to the scope of the Mendelian hypothesis, it may be said that so far as experiments go, they lend promise of large values in practical eugenics. Now it is well known that heredity in man follows the same general laws as in animals. Indeed, Galton long ago demonstrated the certainty of heredity in mental as well as in other factors of the organism. The work of the sociologist has

made this certain beyond doubt in such pr
feeble-mindedness, insanity, idiocy, not to me
ills aligned with syphilitic and kindred mala
fore be assumed that, until there be found c
to the contrary, the dictates of practical prud
us to act, in dealing with the vastly more imp
human betterment, no less intelligently than
of betterment applied to other orders of life. I
that there should be rashness or haste in ass
ills of human generation are to be cured at onc
method. It only implies that there shall be
minded attitude toward a program which has
and promise of betterment in many directions.

EUGENICS A recent writer on racial betterm
his appeal as a "plea for the unborn, the con
effort to lessen the degrading sum-total of unnec
physical degeneracy, suffering, vice, and crimin
a Christian nation insist on handing down to i
responsible offspring, thus stealing their birthri
their right to be healthy and happy; the right
zens, and the begetters of a strong race." (Re
ture, p. 1.)

According to Galton eugenics is "the science
all influences that improve the inborn qualities
of our own students (Davenport) phrases it th
has reference to offspring. The eugenical stand
the agriculturist who, while recognizing the valu
lieves that permanent advance is to be made only
best blood. Man is an organism,— an animal;
improvement of corn and of race horses hold tru
* * * for eugenics has to do with traits that a
the protoplasm."

The problem of eugenics is not, therefore, occu
It is quite within the ken of the child of the nurser
If the humblest gardener may be taught the impo
seed as well as of good care, whether of corn or
herdsman may distinguish between the value of sc
cattle; if the plain farmer may be taught the value

grain or stock and the simple basis of their attainment, all of which is assumed in the extensive propaganda of agricultural education now exhibited in trains chartered by states and schools to teach the lessons of selection of seed corn, barley or wheat; and in the annual expenditure of millions of dollars in state fairs, cattle and horse shows; the triumphs of horticulture, the fleetness of the race horse, the distinguishing marks of Jerseys and Holsteins, Leghorns and Rhode Island Reds, etc., etc., then it may be admitted that the problem is not beyond the average understanding.

Again, we laud the laws which compel the slaughter of tuberculous herds, and that common sense of the farmer who relegates his scrubs to the shambles; but what shall we say of the culpable indifference which fosters the propagation of the feeble-minded and criminal?

RACE SUICIDE This phrase has recently had a wide currency among us, and has provoked a wide range of discussion. On the whole the results have been to arouse some serious inquiry as to actualities. It grew out of the serious facts, well known in several of the countries of Europe, namely, the actual decline of birth-rate as compared with death-rate.

RACE DEGENERACY. It may not be easy to sharply differentiate this from the preceding, yet they differ in this, that while in the first the birth-rate may be actually declining, in the latter there may be, and usually is, an increasing birth-rate, but of such poor quality that it becomes a menace in that it may involve impoverished mental, or physical, or moral characteristics. Impoverished blood may entail anemia, neurasthenia, melancholia, etc.; an impoverished protoplasm may entail a train of woes even more deplorable, in legacies of insanity, feeble-mindedness, imbecility, moral obliquity, and even criminality. Who shall say whether the fulminations of Sinai, however efficient then, are not today an imposition of cruelty, like many modern penal exactions, dealing out punishment where a merciful and sane application of eugenics were the only real cure of such vices!

It is important at this point to interpose a word of explanation. A view has gained currency that eugenics involves aims and methods the exact equivalents of those of the breeder; that par-

ticular points are to be prescribed as in breedin
that some scientific authority, or sponsor gu
all marriage contracts and direct all matings
fact nothing could be farther from the real e
In the language of Galton "eugenics principl
one of the motives in a civilized nation, much
of its religious tenets." That is to say, a sar
pose should dominate in matters of progeny t
acteristics should safely sustain in fair meas
to furnish those types of citizen which best e
of what national or racial character should emb
so enter into the social consciousness that a hea
their realization should become no less efficie
are our religious tenets. So far then from a
and method, that of eugenics is one of natio
moral ideals, to be achieved through intellige
toward racial betterment.

As the serious conclusion of a long and ard
problems the following words of Galton ma
worthy of the most profound concern to every l

"I take eugenics very seriously, feeling that i
to become one of the dominant motives in a civi
as if they were one of its religious tenets. I
to me as partial detachments from the infinit
and this world as a stage on which evolution
cipally hitherto by means of natural selection, v
good of the whole with scant regard to that
Man is gifted with pity and other kindred feel
the power of preventing many kinds of sufferin
to fall well within his province to replace na
other processes that are more merciful and not le
is precisely the aim of eugenics. Its first obje
birth-rate of the unfit, instead of allowing th
being, though doomed in large numbers to pe
The second object is the improvement of the ra
the productivity of the fit." (Memories of My L

Pearson, a collaborator of Galton, and his
great program of eugenics, postulates two funda
conditions which underly any program of pe
betterment.

"1. That the relative weight of nature and nurture must not be assumed *a priori*, but must be scientifically measured; and thus far our experience is that nature dominates nurture, and that inheritance is more vital than environment. Environment may and does modify the bodily characters of the existing generations, but not certainly the germ plasms of the next generation. At most it can provide a selection of which germ-plasm among the many provided shall be potential and which shall remain latent.

"2. All human characteristics are inherited in a marked and probably equal degree. If these ideas represent the substantial truth, you will see how the whole function of the eugenist is theoretically simplified. He cannot hope by nurture and by education to create new germinal types, he can only hope by selective environment to obtain types most conducive to racial welfare and national progress. The widely prevalent notion that bettered environment and improved education mean a progressive evolution of humanity is found to be without any scientific basis. Improved conditions of life mean better health for the existing population; greater educational advantages mean greater capacity for finding and using existing ability; they do not connote that the next generation will be either physically or mentally better than its parents. Selection of parentage is the sole effective process known to science by which a race can continuously progress. The rise and fall of nations are in truth summed up in the maintenance or cessation of that process of selection. Where the battle is to the capable and thrifty, where the dull and idle have no chance to propagate their kind, there the nation will progress, even if the land be sterile, the environment unfriendly and educational facilities small."

Here in Syracuse we have but recently emerged from an active campaign for increased hospital provisions and payments of indebtedness on those already established; a campaign which made its appeal to all sorts and conditions of citizens, from those rich and contributing their thousands to school children contributing their little mites to the same end. And this is necessary and well; we must have more and better hospitals. Then we have our agitation for playgrounds, for parks, for public baths, for technical and vocational schools, etc. It is hardly necessary to mention such well known and imperatively essential matters as pure water, clean milk and healthy cattle to supply it; these are ever with us and their necessity calls for no emphasis. All these are important and compel our sympathy and support. But when

we have built and endowed our hospitals, adde secured needed playgrounds and baths, torn d our insanitary tenements, safeguarded our v slaughtered tuberculous cattle, we are still co serious challenge that asylums for lunatics and more imperative than schools; that jails and reformatories are inadequate for the rapidly in population and must be greatly augmented me tection; that social diseases have become a men character and threaten our physical and mora the same time endanger the unit character of o the family, its sanctity and virility. Are not the of dangers which strike at the very roots of social weal? The conditions of fact are beyo should compel the most serious concern upon t sincere philanthropist and patriot. But it calls rather than immediate action. So far as one ma as yet any single or sovereign panacea availab words of Pearson, once more,

"Every method is curative which tends to decr of the unfit and to emphasize that of the fit. difficult to define the socially fit; but if we turn criminal, the professional tramp, the tuberculous, mentally defective, the alcoholic, there can be littl social unfitness. Here every remedy which te them from the community, every segregation whi chances of parentage is worthy of consideration. thing more to be insisted on with regard to the i stock? A clean body, a sound, if slow mind, healthy stock, a numerous progeny,— these fact represented in the typical Englishman of the pa today that one and all of these characteristics can scientific grounds; they are essentials of an imperi

The relation of the foregoing to public health m less obvious without particular specifications. C importance of fitness of environment,— the home, shop, the factory, etc., there is no longer divergent these we insist upon and have in ever increasing n is there longer question as to matters of clothing, fo

water, wholesome air, clean milk, healthy meats, all these are among those rights demanded alike by rich and poor. And even if in some cases they may involve a higher cost there is less of quibble, provided the wage scale may keep step therewith.

All these we now recognize as among the prerequisites of healthy living, and for the safeguarding of which we demand adequate laws of conservation, inspection, and discrimination. But there has not been evident the same concern in this later campaign for healthy antecedents, sane and sound of mind as well as body, and the physical groundwork for their assurance as in the former. But like the former, there must be here a similar campaign of education. It must be made evident that however important may be various factors already alluded to as comprising a healthy environment, they are at best but accessories of the far more fundamental basis of health which is grounded in ancestral blood and germ plasm. The phrase "blood will tell" is more than a mere guess. It is a fact written in the constitution of all life, and absolute as the laws of the Medes and Persians. But let there be no misunderstanding at this point. It is not the contention that heredity is the only and all-potent factor in that sane mind and sound body of classic phrase. Emphasis has just been iterated concerning environment and its various implications. But the gist of the matter is that, given the factors of soundness and sanity and health in the germinal constitution, environment may make possible the full realization of their normal function; while on the other hand if these same factors be lacking in the germinal constitution, or even seriously vitiated by whatever causes, no amount of environmental beneficence can make good those defects. Nature is basic, the real mother; nurture is a foster mother which may or may not secure their fuller development and fruition. Neither may be alone sufficient, but the latter alone is foredoomed to failure. A program of public health must include both.

Public Address: *Wednesday, Decemb*

THE INTEREST OF THE PUBLIC IN PU WORK

By ALLEN W. FREEMAN, M.I

Assistant Commissioner of Health, Commonwea

There was a time, not long ago, when the sul of the public in public health work could be a chapter as the celebrated chapter on " Snakes was no interest in public health work. At the very long since, it appeared that people at larg est in governmental affairs of any kind. The ently of government as a necessary evil, to be p by paid functionaries who were chosen for ther definite powers, called bosses; that these functic lic officials, were by nature suspicious character and their administration of necessity inefficien The only duties of the citizen under this regi the choice of the bosses at the polls, to pay his plain about the government. The average citi he had about as much interest in the government as the leaves on the trees and, having this belie himself further about the matter.

Times have changed greatly in the attitude of administration. The rising cost of living, affec as well as individuals, has demanded closer atten and state housekeeping as well as to the family citizen has been asking himself whether or not money's worth in policing, fire protection, pavin lighting and the thousand and one other things v community with his neighbor instead of purcha at the corner store. The response to this inquiry diate, and there has come within the last few year increase in efficiency in government in both state and while far from perfect, Mr. Citizen is each yea and nearer to the time when he will get a dollar's for the dollar which he pays at the office of th

With this increase in efficiency has come a marked increase in the scope of government. Mr. Citizen has realized that in addition to the time-honored activities, the necessities of present day life demand that he join with his neighbor in doing many things which twenty years ago were not dreamed of. The community must provide playgrounds, since in the modern city only the very rich can afford private playgrounds for that play so necessary to the development of the normal child. The community must furnish a public bath and laundry, must provide parks and recreation centers, sometimes even dance halls or street railways, must in a thousand ways meet needs which were formerly met by the individual.

Among the broader activities of government, and particularly of municipal government, none has grown more rapidly or demanded more attention than the protection of the public health. Twenty years ago the average citizen had but a hazy idea of what the functions of a public health authority was. To him the health officer was a political doctor who attended to the removal of garbage and dead animals, performed the mysterious rites of quarantine and fumigation, and occasionally subjected everybody to the discomfort of vaccination. The citizen had no conscious need of health protection further than this, and would in fact gladly have dispensed with most of what he had. Today this conception has changed, and is rapidly changing still more. But even today, the greatest need of public health in the civilized world is a greater interest on the part of the public in public health.

It is fair, at this stage of our discussion, to ask what sanitary science offers to society, what proof has it to present of its ability to deliver the goods it offers, and of what should the interest in the subject required of the average citizen consist.

Sanitary science offers to the world today a very definite proposition. It has to deliver a very definite line of goods, for prices fairly accurately fixed, within reasonable periods of time. It offers to society protection against certain preventable diseases, absolute protection in some cases, relative protection in others. It offers to increase the average length of life, to diminish the amount of sickness from preventable causes, to reduce the amount of blindness, deafness and deformity, and as its final aim, to give

every man the chance, barring accidental injuries, the opportunity to live the full time which his physical machinery, under usual wear and tear, is capable of lasting.

As proofs of its ability to deliver the goods specified, sanitary science points to its victories already won, to the lengthening of human life already achieved, to the conquest of yellow fever, the triumph over Asiatic cholera, the eradication of bubonic plague, the practical abolition of smallpox, the control of typhoid fever, the decreasing death rates from consumption, and a list of similar triumphs too long to be catalogued here. If we would know what sanitary science can offer to any community where sanitation is made a paramount issue, we have but to look at the Canal Zone, the only instance in modern history where sanitation has had a free hand, to see what has been accomplished there under the most unfavorable climatic conditions imaginable.

Assuming then that sanitary science offers to society something which is worth while, something which will add to the sum of human happiness and diminish the sum of human woe, that will make life the more worth the living for us all, what part has the average citizen in the work, of what should his interest consist.

Broadly speaking, we would say that the first necessity of the citizen in connection with sanitary work is a conception of the fact that sanitation is the work of society as a whole and not of a few enthusiasts and paid officials, exclusively. The efficiency or lack of efficiency of any sanitary administration affects every citizen in the community, high or low. It has a vital bearing upon the happiness, prosperity and life of every individual. Disease is no respecter of persons, and disease prevention is for no one class or calling.

The second necessity of our citizen is that for knowledge. Every citizen does not need to be a sanitary expert, but every citizen should have some idea of the basis on which sanitation rests, of the possibilities and limitations of public health work and the means by which its ends are accomplished. The fundamental truths of sanitation are simple in the extreme and can be understood by almost anyone of average intelligence, they are, moreover, extraordinarily interesting. There is no more fascinating romance in all literature than the story of the life of Louis

Pasteur, his work, and the wonderful results which have followed that work. Where is there a more thrilling tale than that of the discovery of the transmission of yellow fever. The history of plague in San Francisco is a continued story in which science, politics, and big business are mixed as intricately as in the most thrilling of the tales of the modern novelist. Much of the literature of sanitation can be had for the asking, more is on the shelves of the average library, and all offers to the reader matter not only extremely interesting, but which has a most direct and important bearing on the details of his everyday life. The more perfect the understanding of sanitary truths in any community, the more extensive and efficient will sanitary administration be found.

The third necessity for our citizen is a willingneess to aid public health work, not only by influence with legislative bodies in securing adequate laws and material support, but also by co-operating in those measures which cannot be handled by governmental agencies alone, but need volunteer organizations and unofficial support for success.

When these three needs of appreciation, knowledge and co-operation have been secured on the part of the average citizen, society can begin to secure something of the full measure of good which sanitation offers. But even when all this is done, we cannot be sure of the success of our measures unless we have for their administration a capable sanitarian, a true health officer. He is the man who must lead the van. He must direct the battle and bear the burden of administrative detail. If he be able, diligent, honest and diplomatic the wheels of progress move smoothly and swiftly. If he be incompetent, dishonest, lazy or tactless the wheels move slowly, sometimes stop or even go backward. The prime essential of a good sanitary administration is a good sanitary administrator.

It is very essential at the outset of our consideration of the health officer that we obtain a clear idea as to his possibilities, powers and limitations. The health officer is the individual selected by society to protect it against disease. He, of course, represents society as a whole and no individual or class. It should be clearly borne in mind that he does not represent the medical profession. Treatment of the sick is one thing and prevention of disease is another and a very different thing. The health officer

may or may not be a physician; he shou
officer and at the same time a practition
in the prevention of disease and the in
medicine in the treatment of disease are
in fact, frequently absolutely opposed
doctor is employed by the individual wh
well in the shortest possible time and wi
venience and expense. The health offic
people to see that disease does not spread,
of his work the individual citizen or patien
venience, discomfort and expense. In a case
the interest of the individual and the intere
lutely opposed one to the other. The intere
representatives, the practitioner and the hea
wise opposed.

It is greatly to the credit of the medical pro
son of their close association with sickness
sorrow and suffering, and the almost universa
of physicians as a class, they have so frequent
public health work, often at great personal sacri
no right to demand of a man who makes his l
becoming sick, and in no other way, that he wo
the prevention of disease without other recompe
conscience. There is no greater obligation upon
private practice to take any part in public hea
than that reporting of contagious disease and cert
fact and cause of death which is required by law
other citizen of the community. Public health worl
an institution of society for its own protection.

The burden, therefore, of public hygiene must fa
whom society chooses for this work and recompenses i
in just the same way that the burden of protection aga
is laid upon our police. The physician, as well as
citizen, has very definite functions to perform as w
later, but he should not be expected to bear more th
share of the burden.

Society when it chooses an individual for pub
work should bear in mind the limitations of sanit

sanitarians. Sanitation offers much to the world today, but it has to offer no scientific magic or up-to-date necromancy. The health officer can prevent typhoid fever, but he cannot do it by proclamation, rite or invocation. He needs for the prevention of typhoid fever, trained assistants, materials and labor. The health officer can prevent tuberculosis, but it is by the use of ordinary, every-day, purchasable things and not by the burning of incense or the blowing of trumpets. The prevention of disease is a business proposition depending for success upon intelligence, training, diligence and material support just as much as the building of a good house or the management of a bank.

We must bear in mind also, that in sanitation as in every other human effort, we must pay for what we get. Given efficient administration, the result of sanitary effort is measured very accurately by the amount of money expended in that effort. We cannot get something for nothing, and what we get is proportioned to what we spend.

Typhoid fever, for example, is a disease whose prevention has been so perfected in detail, both of theory and practice, that we can estimate almost exactly in any given community just what we want to do and what it will cost to do it.

The great measure of protection against typhoid fever is, of course, the purity of the water supply. In the presence of a water supply which receives the waste products of human beings and is used without further purification, no other measure of typhoid protection is of value. The cost of a new water supply is easily ascertainable and the results of its installation are almost as easily calculable beforehand. New York State has furnished some of the most conspicuous examples of the results of water purification in lowering death rates from typhoid fever. Albany was one of the first cities in the United States where a polluted water supply which had been accompanied by an abnormally high death rate was purified. This purification was accompanied by a fall in the death rate to a small fraction of the previous figures. This fact is so well known that nowadays but few cities are still to be found whose civic pride will permit them to continue using a grossly polluted water supply. Typhoid fever, in consequence, has lost much of its former terror to city people.

If water were the only means by which typhoid fever were disseminated, the disease would be practically rare in most of the cities of this country, but unfortunately the germ of typhoid fever is not so choice in its means of transportation as to confine itself to water alone. The virus is to be found in the refuse of human bodies, and any means by which human filth may be carried may act as a vehicle for typhoid infection. Such a vehicle is milk, which by reason of its method of handling is particularly liable to receive the virus of typhoid fever. No city may expect immunity from outbreaks of typhoid fever whose milk supply is not carefully inspected at its source,— the dairy farm, and even then occasional small outbreaks will occur in spite of the most careful supervision. The danger of milk infection in typhoid fever and other diseases can be met not by inspection alone, but by careful pasteurization of all public milk supplies under governmental regulation. This costs money.

When we have purified the water and safe-guarded the milk there still remains a certain amount of typhoid which was formerly regarded as residual and more or less inevitable, notwithstanding the fact that certain cities on the continent of Europe, particularly in Germany, have been practically freed from typhoid fever, though they formerly suffered from rates as high as those of the cities of the United States. Recent work in the South, however, has pointed out the way in which this residual typhoid can be practically eliminated. We have found that the typhoid virus, resident as it is in the discharge from the human intestines, can be disseminated by flies and other mechanical means, and that when human filth is exposed to these mechanical agencies, typhoid fever will result. In Richmond, Virginia, the screening of the 3,000 open toilets in the city to prevent access of flies to material contained in them, resulted in a reduction in the typhoid death rate from an average of sixty per hundred thousand per annum to an average of twenty per hundred thousand per annum, and in Jacksonville, Florida, even more striking results were obtained. A much better measure, of course, and one much more in line with modern ideas of cleanliness and decency is the complete sewering of the city from which typhoid is to be eliminated; and in both the cities mentioned this work is being done.

In addition to these measures, the complete eradication of typhoid fever from a community requires the prevention of that typhoid which occurs among those directly in contact with the sick person. This can be almost entirely prevented by the work of medical inspectors and nurses in instructing the family where the case occurs.

We see, therefore, that the measures which are necessary for the complete eradication of typhoid fever from a city are exceedingly simple and common-sense. They are, however, expensive. Pure water and complete sewerage are not cheap, even though it is unfair to charge their whole cost to typhoid prevention. Questions of comfort and convenience and the exigencies of crowded city life demand their installation entirely independent of typhoid prevention. If they had no other functions, however, than the prevention of typhoid fever, they would be well worth their total cost. The other measures necessary for typhoid prevention are not unduly expensive and pay very large dividends upon their cost. It is plain, therefore, that under efficient health administration, the amount of typhoid which any community desires to permit is fundamentally a question of how much the community desires to pay for typhoid eradication. The duty of the health officer in the premises is to see that the amount of money which the community decides to expend for this purpose gets full value in actual typhoid prevention.

In the prevention of tuberculosis, that dreadful scourge whose tax upon humanity not only in human lives and human anguish, but in actual monetary cost, is greater than all other taxes combined, analogous conditions prevail. A certain amount of money, a few thousand dollars, expended in educational work teaching the people the simple, plain truth about the way in which tuberculosis is spread and the means by which it may be prevented, will bring a definite result. It will lessen to a certain degree the number of cases of tuberculosis and the number of persons who die from that disease. A somewhat larger amount of money expended on visiting nurses and tuberculosis dispensaries will result in a still further decrease in the prevalence of tuberculosis. A still larger amount, in fact a considerable sum of money, expended in the construction of hospitals and sanatoria for the treatment of

incipient cases of tuberculosis and the isolation of advanced, will bring still further reduction. When we really desire to get rid of tuberculosis, enormous sums of money will be needed for the improvement of housing conditions. The reduction of tuberculosis, therefore, like that of most diseases, is a graduated affair in which the results to be expected are proportioned to the amount of money expended.

What has been said of these two diseases is true also throughout practically the whole catalogue of infectious diseases. Definite results can be promised as the result of the expenditure of definite amounts of money and all that the health officer can reasonably be expected to do is to expend wisely the amount of money given him by the citizens of the community through their appropriating body.

It is a sad experience, however, of those of us who are called upon to administer the sanitary affairs of cities and states that we cannot be administrators solely, but must inevitably become evangelists as well. The sanitarian, thrown as he is constantly into contact with disease in the mass, sitting at that point where the awful results of the physical ills of man converge, and realizing at the same time the possibilities of preventive measures, cannot but raise his voice in behalf of more vigorous and extended measures on the part of the community which he represents. I know no single health officer who, in his dreams and plans for the future, is not years ahead of the social conscience of his community at large. He is too often a voice crying in the wilderness, struggling against overwhelming odds because society has laid upon him the tremendous responsibility of the sanitation of a large group of people and has failed utterly to provide any adequate means of meeting that responsibility.

It is, of course, inevitable that occasionally a health officer gets so far in advance of his community that he is regarded as a fanatic or a crank, but in most of these cases the fault is not with the health officer, but with society that cannot even bring itself to see the possibility of such advanced measures. Occasionally, too, one inexperienced in practical matters of the public health advocates some measure which, though possibly correct in itself, runs so far counter to existing usages of society as to appear ridiculous.

Such a case was presented a few days ago by a member of the board of health of a city in West Virginia who, according to reports in the daily papers, presented a regulation for adoption by his board to prevent the very common habit or amusement of kissing. There is no doubt that disease is spread by kissing and that much disease would be prevented by its prohibition. At the same time, kissing is a very prevalent habit and has its advantages. It is pleasant. It is so pleasant that in certain cases most of us are willing to take a chance. The most that the average sanitarian would dare advise is the avoidance of what might be termed as unnecessary kissing,— such as the kissing of children or the women kissing each other. Necessary kissing under such regulation would not be interfered with.

Sanitation suffers, too, from fads and extreme views just as medicine, with all its wonderful accumulation of knowledge and all its wonderful achievements in the lessening of suffering, the prolongation of life and the cure of disease suffers from quacks, who with specious arguments and extravagant claims offer some one remedy for all the manifold ills to which the complex human mechanism is heir. There is no cure-all in medicine as there is no one source from which all human ills flow. No man offering to repair automobiles who contended that all those ill, how manifold only an automobilist knows, from which an automobile suffers, were due to defective ignition or to trouble in the universal joint, would long retain the confidence of his customers. Similarly, in medicine and sanitation, a physician or sanitarian who has one sovereign cure for all ills, condemns himself on his face.

The wise health officer, avoiding fads and fancies, rejecting sanitary quackery and preventive cure-alls, takes the solid, sensible, well proved facts of sanitary science for his foundation. Upon them he projects his scheme of improvement, gradual but certain. With his ideals far in the future, he keeps his plans within sight of the possibilities of his community. If he gets too far ahead of his community, he loses the confidence of his people and becomes to them an impracticable dreamer instead of an efficient administrator. But here a little and there a little, holding to what he has gained, and always advancing, he leads his people forward to his ideal.

Surely such a man is worthy of your
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efficient administration, but the added
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diseases will be, not preventable, but prevent
may, like the one horse shay, run until eve
and we have finished the course.

HEALTH OFFICERS AND DELEGATES IN ATTENDANCE AT CONFERENCE

ALBANY COUNTY

Dr. Henry F. Albrecht, Green Island.
Dr. Frederic C. Curtis, Albany.
Mr. Theodore Horton, Albany.
Dr. Wm. A. Howe, Albany.
Dr. Charles P. McCabe, Greenville.
Dr. Henry L. K. Shaw, Albany.

ALLEGANY COUNTY

Dr. A. T. Bacon, Canaseraga.
Dr. C. R. Bowen, Almond.
Dr. W. O. Congdon, Cuba.
Dr. G. W. Hackett, Ceres.
Dr. Frank E. Howard, Friendship.
Dr. L. G. Probasco, Whitesville.
Dr. F. J. Redmond, Fillmore.
Mr. L. J. Rogenmoser, Wellsville.
Dr. Geo. W. Roos, Wellsville.

BROOME COUNTY

Mr. A. W. Beilby, Lestershire.
Dr. D. S. Burr, Binghamton.
Dr. J. E. Doig, Endicott.
Dr. F. McLean, Chenango Forks.
Dr. R. A. Seymour, Whitneys Point.
Dr. E. L. Teed, Lisle.
Dr. W. H. Wilson, Lestershire.

CATTARAUGUS COUNTY

Dr. P. H. Bourne, Salamanca.
Dr. J. E. Crossman, East Randolph.
Dr. E. L. Fish, West Valley.
Dr. W. F. Gardner, Conewango.
Dr. Chas. Kelley, Franklinville.
Dr. A. D. Lake, Gowanda.
Dr. W. E. MacDuffie, Olean.
Dr. Geo. R. Turk, Little Valley.

CAYUGA COUNTY

Dr. H. E. Burdick, Montezuma.
Dr. W. D. Cuddeback, Aurora.
Dr. N. B. Ford, Owasco.
Dr. Clinton E. Goodwin, Weedsport.
Dr. I. J. Hill, Fairhaven.
Dr. B. K. Hoxsie, jr., Sherwood.
Dr. Charles L. Lang, Cato.
Dr. R. R. McCully, Union Springs.
Dr. F. W. St. John, Weedsport.
Dr. Thomas C. Sawyer, Auburn.
Dr. F. C. Smith, Auburn, R. F. D. No 1.
Dr. W. Strohmenger, Kellogsville.
Dr. Geo. F. Weber, Ira.
Dr. Helen M. Westfall, Moravia.
Dr. J. H. Witbeck, Cayuga.

CHAUTAUQUA COUNTY

Dr. G. E. Ellis, Dunkirk.
Dr. Guy Granger, Sherman.
Dr. V. M. Griswold, Fredonia.
Dr. H. F. Hutchinson, Forestville.
Dr. A. F. Soch, Fredonia.

CHEMUNG COUNTY

Dr. Charles H. Erway, Elmira Heights.
Dr. A. M. Loope, Wellsburg.
Dr. F. P. Parke, Elmira.

CHENANGO COUNTY

Dr. L. C. Andrews, Pitcher.
Dr. Paul B. Brooks, Norwich.
Dr. E. F. Gibson, Norwich.
Dr. S. B. Grant, Oxford.
Dr. Burton A. Hall, Oxford.
Dr. A. T. Perkins, South Otselic.

CLINTON COUNTY

Dr. Gilbert Dare, Schuyler Falls.

COLUMBIA COUNTY

Dr. Franklin D. Clum, Cheviot.

CORTLAND COUNTY

Dr. H. J. Ball, Cortland.
Dr. Geo. D. Bradford, Homer.
Dr. Henry Field, Marathon.
Dr. H. F. Van Hoesen, Truxton.

DELAWARE COUNTY

Dr. F. E. Bolt, East Meredith.
Dr. S. Peter Cornell, Sidney Center.
Dr. E. A. Hand, Walton.
Dr. Edward A. Holmes, Downsville.
Dr. M. D. McNaught, Bloomville.
Mr. A. D. Peake, Walton.
Mr. James I. Webb, Walton.
Dr. F. Winans, Franklin.

DUTCHESS COUNTY

Dr. J. Newton Boyce, Stanfordville.
Dr. C. L. Fletcher, Dover Plains.
Dr. Edward J. Hall, Mooers Mills.
Dr. M. M. Lown, Rhinebeck.
Dr. Joseph E. Vigeant, Red Hook.
Dr. J. S. Wilson, Poughkeepsie.

ERIE COUNTY

Dr. W. H. Baker, Williamsville.
Dr. C. E. Bowman, Alden.
Dr. Mark N. Brooks, Springville.
Dr. E. W. Buffum, East Aurora.
Dr. Edward Clark, Buffalo.
Mr. S. S. Farnham, Lackawanna.
Dr. Francis E. Fronczak, Buffalo.
Dr. Lester B. Lougee, Marilla.
Dr. Morris Pitcher, Sardinia.
Dr. Ralph Robinson, Lackawanna.
Dr. B. E. Smith, Angola.
Dr. J. D. Wooster, Wales Center.

FRANKLIN COUNTY

Dr. W. H. Harwood, Chasm Falls, Malone.
Dr. A. L. Rust, Brushton.
Dr. Charles C. Trembley, Saranac Lake.
Dr. C. F. Wicker, Saranac Lake.

FULTON COUNTY

Dr. Henry C. Finch, Broadalbin.

GENESEE COUNTY

Dr. Geo. H. Davis, Le Roy.
Dr. E. E. Hummel, Darien Center.
Dr. J. W. Le Seur, Batavia.
Dr. C. F. McCarthy, Batavia.
Dr. M. P. Messinger, Oakfield.
Dr. E. C. Richardson, E. Pembroke.
Dr. S. C. Sweeting, Pavilion.

GREENE COUNTY

Dr. George Haner, Tannersville.
Mr. Geo. W. Irwin, Catskill.
Mr. Harvey S. Scutt, Catskill.
Dr. Robert Selden, Catskill.
Dr. W. A. Wasson, Greenville.
Mr. Peter Welsh, Catskill.
Dr. C. E. Willard, Catskill.

HAMILTON COUNTY

Dr. H. F. Bonesteel, Sabael.
Dr. John P. Brannen, Long Lake.

HERKIMER COUNTY

Mr. James E. Dingman, Little Falls.
Dr. A. L. Fagan, Herkimer.
Dr. Wm. Landt, Mohawk.
Dr. A. B. Santry, Little Falls.
Dr. Chas. G. Strobel, Dolgeville.
Mr. Wm. Van Allen, Little Falls.
Dr. C. F. Wood, Winfield.
Dr. Cyrus Kay, Herkimer.

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Dr. Norman P. Bentley, Cape Vincent.
Dr. W. C. Fawdrey, Lorraine.
Dr. John T. Fowkes, LaFargeville.
Dr. H. J. Frame, Clayton.
Dr. J. E. Jones, Evans Mills.
Dr. C. M. Lukens, Alexandria Bay.
Mr. F. G. Metzer, Wilna.
Dr. A. L. Morgan, Dexter.
Dr. M. M. Ryan, Philadelphia.
Dr. E. A. Simonds, Carthage.
Dr. E. S. Willard, Watertown.

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Dr. W. H. Cramer, Copenhagen.
Dr. D. Kellock, Harrisville.
Dr. G. H. Littlefield, Glenfield.
Dr. E. N. K. Mears, Lowville.
Dr. F. M. Ringrose, Constableville.
Dr. I. D. Spencer, Croghan.
Dr. P. H. von Zierolshofen, Croghan.

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Dr. B. P. Andrews, Dansville.
Dr. A. T. Bacon, Canaseraga.
Dr. J. G. Morris, Groveland.
Dr. R. A. Page, Geneseo.
Dr. Chas. V. Patchin, Dansville.
Mr. Frank S. Roe, Livonia.
Dr. Geo. W. Squires, East Avon.
Dr. F. E. Squires, Livonia.

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Dr. R. H. Ash, Canastota.
Dr. S. T. Barton, Canastota.
Dr. R. L. Crockett, Oneida.
Dr. Geo. W. Davis, Peterboro.
Dr. W. E. Deuel, Chittenango.
Dr. H. S. Gardiner, Hamilton.
Dr. H. G. Germer, Canastota.
Dr. C. P. Monro, De Ruyter.
Dr. Geo. F. Mills, Oneida.
Dr. J. E. Salsbury, Cazenovia.
Dr. Wm. Taylor, Canastota.
Dr. A. R. Thomas, West Eaton.
Dr. F. C. Watson, Cazenovia.
Dr. Geo. W. Willcox, Hamilton.

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Dr. J. M. Allen, East Rochester.
Dr. P. D. Carpenter, Pittsford.
Dr. D. J. Corrigan, West Webster.
Dr. Jas. B. Foster, Webster.
Dr. J. W. Fox, Fairport.
Dr. John L. Hazen, Brockport.
Dr. S. G. Hermance, Clarkson.
Dr. M. E. Leary, 397 West Ave., Rochester.
Dr. H. J. Mann, Brockport.
Dr. J. E. Ottaway, Charlotte.
Dr. J. Pease, Hamlin.

MONTGOMERY COUNTY

Dr. F. V. Brownell, Canajoharie.
Dr. G. L. Meyer, Stone Arabia.

NASSAU COUNTY

Dr. Joseph H. Bogart, Roslyn.
Dr. Guy F. Cleghorn, Mineola.
Dr. Wm. Rhame, Wantagh.
Dr. H. G. Wahlig, Sea Cliff.

NEW YORK COUNTY

Dr. Hills Cole, New York.
Dr. E. H. Porter, New York.

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Dr. T. P. C. Barnard, N. Tonawanda.
Dr. J. Glenn Ernest, Gasport.
Dr. J. E. Helwig, Martinsville.
Dr. L. M. Jayne, La Salle.
Dr. John C. Plain, Ransomville.
Dr. R. J. Talbot, Niagara Falls.
Dr. F. A. Watters, Lockport.

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Dr. Martin Cavana, Sylvan Beach.
Dr. A. P. Clark, New Hartford.
Dr. J. D. George, Verona.
Dr. Geo. L. Kilborn, Forestport.
Dr. G. C. Lyons, Camden.
Dr. Chas. R. Mahady, Rome.
Dr. G. C. Morey, Remsen.
Dr. G. J. Pollard, Oriskany Falls.
Dr. Otto Pfaff, Oneida.
Dr. J. D. Shipman, Vernon.
Dr. A. E. Stafford, Whitesboro.
Dr. H. K. Worden, Westmoreland.

ONONDAGA COUNTY

Dr. James E. Andrews, Fabius.
Dr. G. L. Brown, Euclid.
Dr. J. W. Brown, Skaneateles.
Dr. Geo. J. Bryan, Fayetteville.
Dr. B. F. Chase, East Syracuse.
Dr. F. R. Coe, Warner.
Dr. W. F. Cregg, Camillus.
Dr. F. H. Doud, Lysander.
Dr. S. Ellis Crane, Onondaga Valley.
Dr. Thos. F. Foreman, Syracuse.
Dr. M. E. Gregg, Elbridge.
Mr. Geo. E. Hannett, Syracuse.
Dr. Geo. Hawley, Baldwinsville.
Dr. H. G. Locke, Syracuse.
Mr. James P. Maloney, Syracuse.
Dr. E. B. Merwin, Manlius.
Dr. H. D. Merwin, Cicero.
Dr. E. B. Kaple, Elbridge.
Dr. A. B. Randall, Liverpool.
Dr. A. B. Rood, Minoa.
Dr. D. M. Totman, Syracuse.

Dr. Chas. E. Weidman, Marcellus.
Dr. R. A. Whitney, Liverpool.
Dr. H. B. Wright, Skaneateles.
Dr. E. J. Wynkoop, Syracuse.

ONTARIO COUNTY

Dr. A. L. Beahan, Canandaigua.
Dr. Ina V. Burt, Phelps.
Dr. O. J. Hallenbeck, Canandaigua.
Dr. B. T. McDowell, S. Bristol.
Dr. A. M. Mead, Victor.
Dr. F. H. Newland, Clifton Springs.
Dr. B. I. Preston, Naples.
Dr. C. C. Ransom, East Bloomfield.
Dr. F. D. Vanderhoof, Phelps.

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Dr. E. G. Cuddeback, Port Jervis.

ORLEANS COUNTY

Dr. H. M. Burritt, Kendall.
Dr. John Dugan, Albion.
Dr. Frank H. Lattin, Albion.
Dr. L. G. Ogden, Barre Center.
Dr. Geo. F. Rogan, Medina.

OSWEGO COUNTY

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Dr. W. H. Conterman, Central Square.
Dr. E. J. Drury, Phoenix.
Dr. Le Roy F. Hollis, Lacona.
Dr. Chas. E. Low, Pulaski.
Dr. A. C. Parker, Altmar.
Dr. L. D. Pulsifer, Mexico.
Dr. C. W. Radway, Mexico.
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